

# electron

A Database Publication

Vol. 4 No. 5 February 1987 £1

## user

## KEYBOARD MAGIC

Making music  
on your  
Electron



**PLAY!** *Compulsive board game  
and two arcade classics*

**LEARN!** *Find out how the  
Electron works*



**ROM cartridges:**  
Complete survey

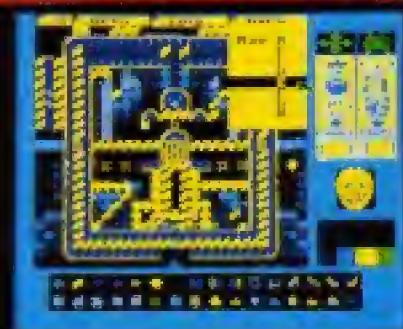


For the COMMODORE, AMSTRAD, BBC MICRO, ELECTRON

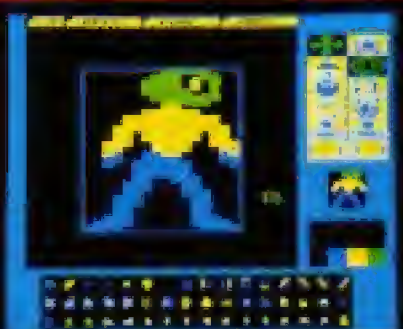
# REPTON

THE ULTIMATE CHALLENGE

# 3



The Screen Editor.



The Character Editor.



Being pursued  
by a Monster



The Time Bomb  
is located



The Poisonous Fungus  
grows insidiously



Collecting a  
Golden Crown

## Are you ready for the ultimate challenge?

Our original Repton game was immediately acclaimed as a refreshingly new concept: a game requiring dexterity to complete its arcade-style elements, and clear logical thinking to solve its strategic puzzles. Repton involves retrieving treasure from cleverly-constructed traps of falling rocks whilst avoiding the fearsome monsters and haunting spirits. "This is an astounding game reaching new heights in BBC arcade adventures," enthused the Micro User magazine.

Last Christmas saw the release of Repton 2, larger and much more challenging than before. Acorn User's Technical Editor Bruce Smith wrote: "Repton 2 is better than anything I've played on the BBC Micro or Electron. Brilliant!"

Now, completely rewritten and improved for the Commodore, Amstrad, BBC Micro and Electron, we proudly present Repton 3. For the first time, a screen-designer is included: try to devise screens that will perplex your friends, then see if you can solve their newly-designed screens. Another innovation is the character-designer which enables you to design your own monsters, rocks, eggs, spirits, diamonds... any or all of the game's characters can be redefined as you wish.

Repton 3 is much larger than its predecessors — it has 24 fascinating screens, and players who are skillful enough to complete them all can enter our prize competition described below. All the favourite Repton characters have been retained, together with several new features: a creeping poisonous fungus which grows at an alarming rate; time bombs and time capsules (for puzzles in the 4th dimension); and golden crowns as well-deserved rewards for your endeavours. **Can YOU complete Repton 3?**

### PRIZE COMPETITION

If you complete Repton 3, you can enter our competition. Prizes include over £200 in cash, with T-shirts, mugs, badges and pens for runners-up.

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BBC MICROS: B, B+, MASTER, MASTER COMPACT • ELECTRON

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Amstrad Cassette.....	£9.95	Master Compact Disc.....	£14.95
Amstrad Disc.....	£14.95	Electron Cassette.....	£9.95

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The screen pictures  
above show the  
BBC Micro version of  
Repton 3.



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## News

All that's new in the ever-expanding world of the Electron. **5**



## Adventures

More tips, clues and magic spells from our resident wizard as he endeavors to help those stuck in far away and long-forgotten lands. **10**

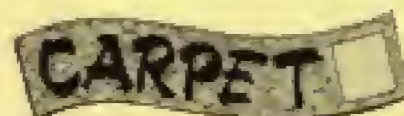
## Software Survey

Operation Safras: An Impossible Mission or Treasure Hunt? Our frank reviewers give them a whirl. **14**



## Keyboard Player

Turn your micro into an Electron-ic organ and have fun creating merry melodies. **18**



We show how a few simple commands can create an impressive graphic display. **23**

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After seeing the PLOT it's up to you to DRAW your own conclusions. **27**

## Hardware Projects

The second part of our series on expanding your Electron moves on to investigate the analogue port. **29**



## Maze

Help Barney the bear escape from the creepy castle in this fast arcade game. **33**

## \*Trek

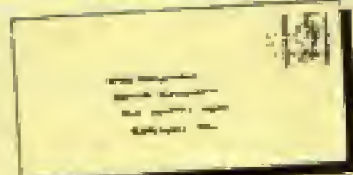
We evaluate a powerful disassembler that actually comments on the machine code! **37**

## GCOL

Need extra colours on your micro? We show you how with this short utility. **39**

## Tommy and the Toadstools

Guide Tommy home through the woods, but watch out for the poisonous toadstools - they're deadly! **41**



## Micro Messages

The pages you write yourselves. A selection from the many lively, interesting letters you've been sending us over the past few weeks. **47**



Two short, yet most impressive listings from our clever readers. **55**

## Basics

Line numbers are needed in order to program in Basic. **58**

## Hardware

A whole host of cartridges and rom adaptors come under the microscope in this comparative review **60**

## Bargains galore!

Don't miss our special offers on Pages 50-53.

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## GOAL! BBC/Electron

The first realistic football simulation for the Electron featuring excellent graphics, music and an intelligent opposition that actually adjusts its skill level during the game depending on current state of play.

Cass. **£7.95**

## FUTURE SHOCK BBC/Electron

An amazing new style of Arcade game with inter-active sub plots, using large detailed graphics for superb detail. This game pushes the machine and the player to unparalleled limits for many hours of enjoyment making this a game not to be missed.

Quote from Electron User: - December Issue.  
"Future Shock is an excellent program, a game which overflows with character and humour." "Overall Rating 9/10"

**£7.95** Cass.



## THE BIG K.O. BBC/Electron

Finally a BBC/Electron Boxing Simulation of the highest quality. This game offers features until now not seen on Acorn Computers.

Superb sound, quality, super-size graphics, 6 progressively more cunning opponents and a multi-player mode will undoubtedly make this the Sports Simulation of 1987.

Cass. **£7.95**

NEW RELEASE

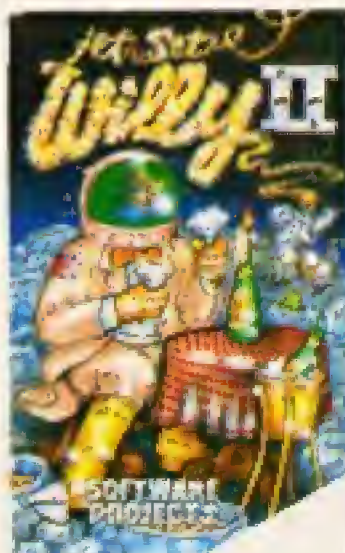
## JET SET WILLY II BBC/Electron

Over 90 screens of this classic game will give even the most skilful player the ultimate challenge.

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SHOTS  
FROM  
VARIOUS  
COMPUTERS



# electron user NEWS

February 1987

## Data puts team on top

AN Electron is helping a pub football team show a clean pair of heels to its rivals in the local league.

In fact the machine has brought about a remarkable change of fortune for the Welcome Inn in a Greater Manchester Sunday league.

Last year they won only three matches. Yet so far this season, after losing their opening match, they have won 10 on the run.

Manager Peter Wright has been able to affect this dramatic reversal of previous form, with a little help from his Electron.

"I have the forthcoming week's opponents watched and the data recorded in the machine", he says.

"Also, I have written a program in which I can cross match our strengths with their weaknesses.

"And from this I work out the game plan.

"If an opposition player is reported to be nervous, then the computer suggests he warrants the attention of our

## Electron's rarity value shoots up

THE Electron is now the most sought after machine in the second hand market place.

So much so that the machines often change hands for up to 80 per cent of the current price tag.

News of the upsurge in demand for used Electrons comes from Micro Mart, the leading publication covering the second hand home computer scene.

"One of the reasons for this is that it is such a good machine that people rarely get rid of them", Stewart Summerville of Micro Mart told *Electron User*.

"Consequently when one does come on the market, it fetches a top price.

"If this trend continues then in years to come there is little doubt that Electrons will become collectors' items — and their value could then rocket".

A recent advertisement offering an Electron for sale

ELECTRON & PLUS III Disc Drive, also ROM box TZP3, Ekman, Star-graph, ROMs, Database disc, games, books, etc. 10 discs. £180. Phone 0925 30087 and.

ELECTRON PLUS 1 Cummins Disc Interface, Electron User's, lots of s/ware incl. View, T2CU, all £170 and. Tel. Northampton 0604 410721

Recent adverts in Micro Mart

ELECTRON PLUS 1 E2P 2nd Processor, AP4 Disc Interface, View, 13 games tapes £210 and. Tel 0268 777324.

ELECTRON COMPUTER PLUS one, IF Cummins DFS & Drive & View Word Processor, all for only £360 + P&P. Phone 01550 8965.

brought some 50 telephone calls within 48 hours.

"The phone never stopped ringing", said advertiser John Sturrock. "You would have thought I was giving away a Rolls Royce for free from the response.

"As it was, the first person who came on bought it for the price I was asking, though subsequent callers offered me more".

Meanwhile sales of new Electrons are reported to have been heavy over the Christmas period.

"It's a machine whose popularity never seems to wane", said one retailer.

"Fortunately there are some very clever peripheral people in this sector of the market who are constantly enhancing the Electron to keep it up to date.

"And it is also well supported in terms of the software available.

"All of this adds up to the fact that there is little doubt that this is one of the most successful machines in the history of home computing".

## A CHESS CLASSIC FOR THE ELECTRON

THE CDS Software classic Colossus 4 Chess has finally been made available for the Electron.

The program earned its fame by defeating 24 other computer chess games in a gruelling series of 16-game matches and it's generally

acknowledged to be the strongest of its type on the market.

With its backtrack facility, problem-solving mode and handicapping feature, Colossus 4 Chess provides beginners with a friendly tutor and veteran players with a tough

opponent.

The program was written by Martin Bryant, author of White Knight 12 — coincidentally one of the games beaten by Colossus 4 Chess. Cassette price £9.95.

Also new from CDS is Brian Clough's Football Manager, a

combination board and computer game simulating the trials and tribulations of a soccer boss.

Two to five players can take on the role of team manager competing against each other and the computer. Price £14.95.



# Hits from combined forces

THANKS to recent cooperation between two leading software houses, Electron owners can now buy eight top-selling games at a fraction of what they cost when they were originally issued.

Acornsoft and Superior Software have combined forces to produce Acornsoft Hits Volumes 1 and 2.

Volume 1 contains Magic Mushrooms, Planetoid, Maze, and Monsters. Volume 2 includes Starship Command, Arcadians, Meteors, and Snooker.

The dual cassette packages cost £9.95 each.

Superior Software managing director Richard Hanson told *Electron User*: "These are quite definitely the best compilation packages ever produced for the Electron."

"Previous compilations have got to number one in the software charts, and I'm sure both volumes of the Acornsoft Hits will also."

"It's hard to say which package will prove the most popular - we've aimed at achieving an equal balance, with Magic Mushrooms heading Volume 1 and Starship Command the prime title on Volume 2".

## Sporting Electron

From Page 5

player known as King Kong. "With a bit of luck thrown in as well, we seem to have got it licked".

Regulars at the Welcome Inn who support their team have been amazed by the way their lads have improved.

"They were a total load of rubbish in the past", one told *Electron User*.

"But this computer thing seems to have spurred them on in a way I would have thought was impossible before."

"It's not turned them into a team which would worry Manchester United, but they'll do for us".

# It's showtime again

THE record-breaking Electron & BBC Micro User Show returns to Manchester next month for the fourth time.

The show will take place at the Renold Building, UMIST on March 20, 21 and 22.

The Northern showcase for all that's new on the Electron scene looks set to

be an even greater success than its predecessors.

More than 10,000 enthusiasts visited the last Manchester show, held in September.

Organiser Database Exhibitions is confident that an even larger number will attend the coming event, which has

over 70 companies exhibiting and a host of new products available for the Electron.

Once again the Acorn Theatre will be a prominent feature of the exhibition, and leading micro experts will be on hand to provide information on the latest peripherals and software.

John Everyman - INVESTMENTS HELD at 3/4/87										
NAME	Pur Date	Cost £	Offer p	No of Units	Bid p	Value £	C/gain £	APR %	RISK 1	
GBD One	06/08/86	3000	750.0	400	990.4	3962	962	17	-1	
GBD Pacific	06/08/86	10000	109.0	9174	133.0	12201	2201	15	2	
LAR Spear Bits	07/05/86	1797	54.8	3279	56.4	1854	59	4	4	
Trus Euro	07/05/86	1000	50.3	1988	54.0	1074	74	8	-1	
GBD Arab Acc	07/05/86	1000	50.3	1988	49.3	978	-378	40	4	
Just H/Kong	21/07/86	4000	152.5	2624	144.2	4038	338	13	1	
ROUTE PLC	10/10/86	1000	170.0	600	175.0	1050	50	20	1	
O of Sawing	01/10/86	100	100.0	100	124.0	124	24	100	-2	
Kendall Ltd	11/08/86	1400	2475.0	60	2690.0	1614	14	1	-14	
Kendall Prod	01/02/87	4000	100.0	4000	105.5	4220	220	21	-13	
Turner & Drs	02/02/87	2000	124.0	853	241.4	2054	54	20	1	
Greens Prod	03/02/87	3000	1200.0	1250	1240.0	3100	100	20	1	
TRF Inv Trust	04/02/87	4000	100.0	4000	102.4	4096	96	14	0	
Anglia Bank	04/02/87	44000	844.6	9910	844.0	83601	1	1	2	
Trl Casadilly	04/02/87	2000	191.7	1000	190.0	1900	-20	22	-5	
Presso One	10/02/87	9933	3485.0	400	2454.0	9824	-109	100	0	
Thrusk Prod	01/03/87	1200	1225.0	98	1018.0	998	-202	100	-5	
Glinke Land	04/03/87	80000	567.0	14109	566.0	80139	139	2	-9	
Olding Inv Trst	08/03/87	3330	120.0	2775	122.0	3386	56	25	-27	
RTX Inv Trust	09/03/87	3454	110.0	3142	115.4	3624	170	25	-38	
TOTALS		114899				121917	5088			

John Everyman - INVESTMENTS SOLD in Year to 3/4/87										
NAME	Pur Date	Cost £	Sale Date	No of Units	Bid p	Value £	C/gain £	APR %		
Dutch Barges	23/04/86	1508	290786	4020	56.4	2267	747	13		
OSP West Prod	07/05/86	2000	000287	3974	45.3	1797	-203	10		
GBD East Trst	13/11/86	5548	310287	5000	189.4	9470	3872	100		
TOTALS		9056				12489	4404			

John Everyman - DIVIDENDS RECEIVED IN YEAR to 3/4/87										
		TAXED AT SOURCE			UNTAXED AT SOURCE					
		Date	Amount	Tax Credit			Amount			
GBD One	04/05/86		125.56	56.31			181.87			
St Gills Bond	08/05/86		100.00	0.00			100.00			
N/Bv Inv Bond	01/07/86		100.00	0.00			100.00			
Kendall Prod	02/07/86		238.43	95.44			333.87			

## Caring for your stocks..

TO serve the growing army of stock market investors with moderate means, Squirrel Software has added to its Care Utility series.

Investment Care for the Electron is also for experienced investors, but it has been inspired by recent public share offers.

"The program has been written with the new breed of more modest holders of TSB, British Telecom and British Gas shares very much in mind", Squirrel managing director Alan Turner told *Electron User*.

"It produces several statistics which should help these people decide when best to sell in order to convert their paper profits into cash".

Investment Care keeps track of unit and investment trusts, stocks and shares, producing displays of purchase and bid details for each

investment.

Printouts of current holdings, sales in current tax year, and dividends received are available.

Offer and bid prices are easy to enter, and the true position of the user's portfolio can be seen at a glance.

Investment Care costs £13.95, or £24.95 when bundled with Cash Care, Building Society Care and Vat Care utilities.

## CHART-TOPPER FLIES IN

LATEST release for the Electron from Bug-Byte is Skyhawk, a shoot-em-up game that has been a chart topper on other micros.

Converted by Tennis author

Margaret Stanger. It requires the player to protect his Skyhawk fighter plane against flights of enemy aircraft scrolling over the screen. Price £2.99.

## Rombox winners

MANY thanks to the 711 readers of *Electron User* who sent in entries for the Slogger Competition in the November issue.

It took quite a while to read every single slogan, but eventually we chose 15 top class entries. The prizes are already on their way to the winners.

First prize: A Rombox Plus and Starword to Joseph Hornsby, age 12, from Torquay for "Slogger Ltd Opens the Gates to Genius with Exceptional Results".

Second: Rombox and Starword to Andrew Hardy, age 13, from Dorset for "Slogger Leaves Others Grounded by Getting Everything Right".

Third: Rombox and Elkman to Ian Cameron, age 32, from Inverness for "Still Leading Others at Generating Goods for the Electron Range".

Other prizes: Mark Bullard, Plymouth; V Hayter, Milton Keynes; B L Smith, Slough; Lex Lagoon, Kent; Trevor Coatsworth, Cleveland; C Shipton, Bristol; Timothy Medcraft, Faversham; Richard Gibson, Winchester; David Moore, Clwyd; Alexis Adamou, Brentwood; Chay Ireland, Northants; Simon McCormick, Strangford; Douglas Cartwright, Ilford; M.D. Russell, Newton Abbot; Simon Hopkins, Retford.



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Pictures

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### Mathematics 2 age 9 upwards

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Long Division 1/Number Signs

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### PMS ANNOUNCE...

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Now, thanks to the power of the E2P Second Processor, Electron users can run the most popular BBC wordprocessor - Computer Concept's WORDWISE PLUS. PMS programmers have re-written the MODE 7, WORDWISE screen handling, and keyboard routines to work on an Electron with E2P. Not only this, but because a Second Processor is being used, a massive 42K - yes! over 42,000 characters - of text can be handled, with PREVIEW ALWAYS in an 80 column MODE!! Add to this the fact that E2P WORDWISE PLUS is totally disk based, requiring NO ROMS or cartridges.

E2P WORDWISE PLUS is a full implementation of the original WORDWISE PLUS, with all the SEGMENT MENU features maintained. WORDWISE files created on a BBC can be loaded into the Electron and vice versa.

PMS are offering E2P WORDWISE PLUS at an introductory price of

**ONLY £39.95 (Inc VAT & delivery).**

E2P WORDWISE PLUS is supplied on 3.5" or 5.25" disk (state size & DFS format, when ordering) together with full WORDWISE documentation. E2P WORDWISE PLUS is available ONLY from PMS. NOTE: This is a special version of WORDWISE which will NOT run on a BBC or unexpanded Electron.

PMS overseas dealers: VELOBYTE COMPUTERS, Schiedamsedijk 5A-6A, 3011 EB Rotterdam, Netherlands.

### ORDER FORM

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I enclose cheque/postal orders for a total of £ \_\_\_\_\_  
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A/c No. \_\_\_\_\_ Expiry date \_\_\_\_\_

NAME \_\_\_\_\_ SIGNED \_\_\_\_\_

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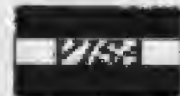
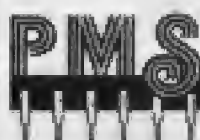
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Electron User, June '86

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Acorn User, July '86

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Our versatile cartridge continues to grow in popularity and demand. This ROM/EPROM adaptor is a quality product fully enclosed in an Acorn approved casing, providing full protection for your valuable firmware! A.R.A. 2 not only allows BK (2764) & 16K (27128) ROMS/EPROMS but also supports 27S13 & 27011 devices (when used with the correct software) for which we are currently developing new products. Fully compatible with the Master Computer & Electron Plus I

### THIS IS WHAT ELECTRON USER SAID ABOUT A.P.5:-

"Looking at the A.P.5. shows it to be constructed to a high standard, it looks solid and robust.

The A.P.5. Interface opens up the new Electron for a whole new type of computing. "E.U Dec '86

# AMX MOUSE

## POINTS THE WAY FOR THE ELECTRON USER

### AMX MOUSE

Catch an incredible AMX MOUSE! The advanced opto-mechanical device that brings to your ELECTRON facilities once only available on more expensive computers. Now you can use ICONS, WINDOWS, AND POINTERS in your own programs.

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Plug the MOUSE into the user port, and the EPROM into your A.P.5. The latter contains fast machine code routines for creating on-screen windows, icons and pointers. And means that the MOUSE buttons can be programmed for use with commercial software such as Wordwise and View. There are two manuals included, explaining how to operate the MOUSE and the ROM routines, which are available in both basic and machine code programs.

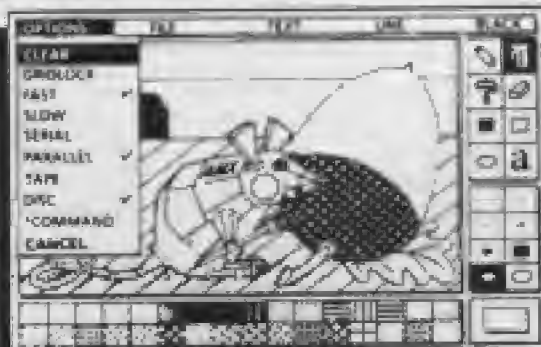
Included in the package are two superb programs:

AMX ART has to be seen to be believed! It's a computer-aided drawing program that's just as good for serious applications - such as the preparation of detailed architectural and engineering drawings or teachers' worksheets - as it is for having lots of family fun! And if you're artistically inclined, you'll be astonished at the quality of work you can produce and save. It makes full use of on-screen menus, pull-down menus and icons. The ideal, easy way for novices to learn and gain in confidence.

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The ACP/AMX mouse package may be used on an ELECTRON fitted with a PLUS I & AP5. The 'ART' software is supplied on cassette but can be transferred to DISC (DFS not ADFS)

£69.95



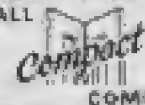
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A triple interface cartridge providing...

1) a TUBE I/face allowing a second processor to be connected, increasing BOTH speed & memory (PAGE & See HIMEM & See in all modes)

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ACP have totally re-written the Acorn 1770 DFS, enhancing existing features & adding new ones. The result is probably the fastest & most powerful disc filing system your computer could have. With the ability to operate in double density occupying both sides of the disc (640K). Automatic file relocation, improved file handling, 62 file catalogue and Sways RAM can be used as a fast RAM DISC

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An alternative to our AED(05) for Plus 3 and ASR users. This optional alternative DFS is designed for use in Sideways RAM (ASR) and allows the user to operate a disc filing system

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(3 1/4" ADFS disc + manual)

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Equipment codes /M/ = Master /B/ = BBC /E/ = Electron /E+1/ = Electron + Plus 1 /C/ = Compact

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Advanced Computer Products Ltd.  
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please include your tel. no.)

(PRODUCT No)	PRODUCT	QTY	@	TOTAL
NAME .....				
ADDRESS .....				
POSTCODE .....				
TEL. ....				
CREDIT CARD No. ....				
I enclose payment for £ .....				
EXPIRY DATE. .... (Ref E21)				



# Your chance for immortality

**BIG** news this month! Larsoft, a brand new adventure software house specialising in the Electron, has been formed by Geoff Larsen who will be a familiar contributor to regular readers.

Based at 4, Chantry Road, Clifton, Bristol BS8 2QD, to date Larsoft has released three titles: The Rising of Salandra (a two part fantasy), Wychwood and The Nine Dancers.

After some hours plotting my way through the third of these I have to conclude that it is superb value for money at only £3.95.

All three adventures are very professionally packaged and from previews appear error and bug free.

Not to be outdone, a passing raven told me that Potter Programs has recently released six new adventures.

There's a pack of four, including Inner Space, Hexagram of Trutania Valley, Stranded on Iloofrax and Philosopher's Stone for

only £5.95.

And the other two titles, priced at just £2.95 each, are Flint Strikes Back and Grounded.

If these adventures follow the standard of Twin Orbs of Aalnor they will be well worth buying.

Meanwhile, news from Essex is that Shards is offering the first six people to complete its adventure, Operation Safras, the honour of being characters in the next blockbuster release.

This is your chance to be immortalised on software!

Two more regulars to this column, Harry Bastien and Les Shipton, have earned themselves the distinction of officially becoming the first adventurers to conclude Robico's Myorem.

They now go into a final draw for that £100 first prize. May I offer my sincere congratulations to both of them and add that they beat me to it by a fair number of days!

While on the subject of Robico - a runner from

South Wales brought me a scribbled note from Rob O'Leary to say that complete hint sheets are now available for Rick Hanson and Project Thesius.

To obtain one, all players need do is return their old help cards with a stamped addressed envelope.

It will come as no surprise to readers of this column and connoisseurs of text adventures to see that Robico dominates the top ten in popularity.

The only reason that Myorem isn't number one, in my opinion, is the relatively short time it has been available.

It's good to see old favourites such as Sphinx and Sadim Castle still up there in the chart.

But it's perhaps surprising to see Epic toppled so violently - where is Kingdom of Klein or Quest for the Holy Grail?

I also find the great popularity of Terrormolinos and Hampstead interesting - it proves that we have a sense of humour!

Don't forget that this is your chart so keep those votes coming in and the next Top Twenty should appear in three months time.

I would like to thank Emma Rutherford of Nene College for her superb maps to Philosopher's Quest and Circus Adventure. There's a copy of Myorem on its way to you, Emma.

And there is a copy of Adventure Soft's Rebel Planet waiting for the first full solution I receive to Castle of Riddles - I am absolutely flummoxed by this one.

I have just received Robico's Enthar Seven.

I know that the Mad Hatter has already reviewed this adventure, but I must just



add that if you want an excuse for buying a disc drive, then this is it!

Sheila Beattie has suggested that to help readers when ordering back issues of Electron User, I should mention the issues where help has been given for certain adventures.

It would be impossible to do this for all adventures, but I will occasionally do it for the more popular games.

Here goes: Help has been given for Woodbury End in the following issues of Elec-

## OVERTURE AND BEGIN

Last month I suggested that you take an exploratory ramble through your new adventure.

However, if you want to achieve a modicum of success as an adventurer, progress must be much more methodical.

When Theseus slew the Minotaur in the labyrinth of Minos he ensured his safe return by leaving a trail through the maze with a ball of wool.

Like Theseus (unless you have a photographic memory) it is almost obligatory that you make a map of your route.

Essentially there are three types of map for solving text adventures - grid, random and logical. The first two are pictorial representations, the last a written route.

Once I have explained

## KNIGHTS OF THE ROUND TABLE

This section is devoted to more experienced adventurers who have offered their services to other readers having difficulties with specific adventures.

If you write to one of my Knights please remember to enclose a stamped addressed envelope.

Kneel and rise:

Sir Toby Edwards of Woodhill Cottage, Neighbourne, Oakhill, Nr. Bath, Avon BA3 5BQ, who offers help with:

Adventure, Adventureland, Stolen Lamp, Woodbury End, Spiderman, The Incredible Hulk, Mystery Fun House,

Pyramid of Doom, The Count, Wizard of Akryz, Wheel of Fortune, Castle Frankenstein, Quest for the Holy Grail, Classic Adventure, Kingdom of Klein, Philosopher's Quest, Super Agent Flint, Eye of Zoltan, Galadriel in Distress, Pettigrew's Diary, Five Stones of Anadon, Stranded, Terrormolinos, Ghost Town, Castle Quest, Ring of Time, Twin Kingdom Valley, Gisburne's Castle, Bored of the Rings, Castle of Riddles, Greedy Dwarf and Fantasia Diamond.

What do you do in your spare time Toby?



## TOP TWENTY

1. Rick Hanson (Robico) 93%
2. Woodbury End (Shards) 90%
3. Project Thesius (Robico) 89%
4. Terrormolinos (Melbourne House) 88%
5. Hampstead (Melbourne House) 85%
6. Ferryman Awaits (Kansas City) 81%
7. Twin Kingdom Valley (Bug Byte) 76%
8. Sphinx Adventure (Acornsoft) 75%
9. Myorem (Robico) 72%
10. Wheel of Fortune (Epic) 70%
11. Twin Orbs of Aalnor (Potter) 69%
12. Countdown to Doom (Acornsoft) 68%
13. Philosopher's Quest (Acornsoft) 64%
14. Incredible Hulk (Adventure Soft) 61%
15. Savage Island 1 (Adventure Soft) 60%
16. Classic Adventure (Melbourne House) 59%
17. Castle Frankenstein (Epic) 56%
18. Dracula Island (Kansas City) 54%
19. Rebel Planet (Adventure Soft) 53%
20. Sadim Castle (M&P Software) 51%

tron User: February, April, June, July, August, September and December 1986, and January 1987.

Help for Twin Kingdom Valley has been offered in: June, July, November, December 1985. Also January, February, April, September 1986 and January 1987.

I hope that is of use to quite a few people.

I received a very interesting letter this month from

Mrs Pat Winstanley. She runs a club and magazine called Adventure Contact for authors of home-penned adventures.

If any of you are taking seriously your Quill, Adventurescape or Graphic Adventure Creator, or are interested in writing your own machine code adventures then write to:

Adventure Contact, 13 Hollington Way, Wigan WN3 6LS, for more details.

## Hampstead: Map 2

### Hints

Artists like the oddest things!  
Don't forget the old school tie!



## WISDOMS

each, you can choose the type most suitable for you.

Let us begin with the grid map: Presuming that you do not yet possess one of my adventure mapping grids which I mentioned last month, you need to equip yourself with a piece of graph paper, a pen and a ruler.

Let each 2cm square on the paper represent a possible location in your adventure.

If you are a little unsure of your compass directions, draw a small diagram on the edge of your graph paper (North going up, East going right and so on). For simplicity we will call each location you visit a ROOM.

Begin playing your adventure and in the centre square of the paper inscribe briefly the room

description.

For instance in my example from Sphinx Adventure in Figure 1, I have called the first location Top Mountain.

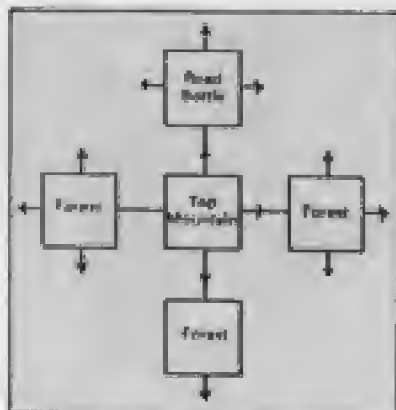


Figure 1: Grid mapping

Now take note of any information you are given referring to your various exits. Mark small arrows from your square in the direction of the available routes.

As you travel around,

mark the new places you find in the relevant adjacent squares to your starting room.

For instance, moving South, East or West from Top Mountain I find I am lost in a forest, yet travelling North I discover a road.

It is also essential that you note in the appropriate squares any objects or treasures discovered. Thus in the first room north I find a bottle - which I also take.

I remember vividly when exploring Quest for the Holy Grail, I found myself in a cave with an open hole in the roof but no means of reaching it. I then remembered a ladder I had seen at a much earlier room.

Thankfully I had noted its location and a quick sortie back enabled me to

take the ladder and progress up through passages in the cave.

If you run off the graph, simply start on the opposite edge of another sheet of paper and mark reference arrows to show where sheets join.

The same applies if you ever have to climb up or down. You simply start in a corresponding square on a separate sheet and make that paper level +1 or -1 and so on.

This mapping technique works with all adventures which follow logistical compass routes such as Rick Hanson or Castle Frankenstein.

But for others like Classic Adventure you will need to adopt a random mapping procedure. For that you will have to read next month's column!



## From Page 11

### PROBLEMS SOLVED

W.E. Trevelyan has supplied a superb listing to cope with the bug in the save game facility in many copies of Woodbury End.

Early versions of this game allow you to save your position and later reload it but don't allow you to go on with the game and save a later position.

This listing is an alternative to the loader program with the loading screen eliminated.

It enters data into zero page, loads the main program, inserts the oscli routines for save/load and runs the main program.

Data files can then be saved and reloaded any number of times during the game.

Type in Program 1, save it with the filename LWOOD then type in:

```
PAGE = 45000
CHAIN 'LWOOD'
```

When it has loaded insert your Woodbury End tape.

I am also grateful to Damon Wingfield for his plethora of tips and solutions to a variety of adventures, including Voodoo Castle, T.K.V., Secret Mission and Sorcerer of Claymorgue Castle.

I shall pass these on in due course to readers who have difficulties with these adventures.

I must point out that I am unable to give any help with Myorem until after 30th April, which is the closing date for Robico's competition.

Then, judging by demand, I may just do a special on this superb

```
10 REM Woodbury Save      e41
20 REM by W.E.Trevelyan    600 NEXT
30 REM (c) Electron User   605 REM
40 REM PAGE must be 45000  610 start=45200:end=45800
50 MODE6                  620 $B10="SAVE"+ " "+file
500 ?401=449: ?400=45E: ?40  $+ " "+STR$ "start+" "+STR$
3=44E: ?402=454: ?405=44F: ?40  end
4=44C: ?407=42B: ?406=4F0: ?40  630 RESTORE1010
9=449: ?408=49B: ?400=44F: ?40  640 FOR IX=0 TO 4
A=416                      650 READ byte$
510 ?47B=0                 660 IX?43046=EVAL("4"+byt
515 VDU23;0202;0;0;0;    e41
520 REM                    670 NEXT
530 +LOAD WOOD             680 REM
540 file$="DATA"           690 +TAPE
550 $B00="LOAD"+ " "+file  700 CALL 4490C
$                             900 END
560 RESTORE 1000           1000 DATA A2,00,AD,00,20,F
570 FOR IX=0 TO 6          7,FF
580 READ byte$             1010 DATA A2,10,4C,7A,30
590 IX?43070=EVAL("4"+byt
```

Program 1

adventure.

While on the subject of specials, next month I aim to give extended help -

including a cassette offer - on The Ferryman Awaits, which seems to be foxing a lot of people.

QUAL-SOFT

# THOUGHTWARE

Sports simulations

## SOFTWARE THAT CHALLENGES, SOFTWARE THAT LASTS!!

Way back in 1983 we introduced LEAGUE DIVISION 1 for the BBC Micro. In September 1984 the original version of SOCCER SUPREMO, an Electron Version of this game, was introduced. In both games you become the manager of a newly promoted 1st division team, which you have to build up into a challenger, and hopefully winner, of the 1st Division Championship. The game uses professional simulation techniques which produce a true, natural management simulation rather than the simple minded mental arithmetic exercises of other "simulations". This caused this response:

*"Hugely enjoyable but dangerously addictive"* says Dr. Trevor Harley, Department of Psychology, University of Warwick

(He's bought four of our soccer management games)

**YOU AIN'T SEEN NOTHING YET!!**

THE NEW

# SOCCER SUPREMO

## A SOCCER MANAGEMENT SIMULATION

To the original version of SOCCER SUPREMO we've added: the F.A. Cup, the European Cup, the U.E.F.A.Cup and the European Cup Winners Cup. We've introduced multiple DATA files for the different seasons and to allow a massive transfer market of over seventy players, from World Cup stars to top scoring non-league players, we've retained the 3D, 22 man, 90 minute football match graphics, improving the graphics' layout. We've added sound, in-match injuries, named goal scorers, penalty shoot-outs (European matches), and replaced the complicated match statistics with a post match individual player assessment. We've ..... well, lots of other small improvements.

The game is now almost three times the size of the original, using two tapes plus the multiple datafiles. But .....

**WE'VE ADDED NOTHING TO THE COST!**

The new SOCCER SUPREMO is supplied DIRECT from Qual-Soft on a same day basis. TAPE 1 + TAPE 2 + MANUAL, P&P and VAT still costs £9.95. Owners of the original SOCCER SUPREMO can obtain a £5.00 rebate by returning their tape with their order. Include payment for £4.95

QUAL-SOFT  
Dept. EU,  
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Stevenage SG2 8RX

Tel: 0438  
721936

Please supply:  
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SUPREMO  
for my Electron

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Access No. (if applicable) \_\_\_\_\_





# FRENCH

on the  
RUN!



**The adventure game  
with a big difference.**

**£9.95  
cassette**

**You're on  
your own in  
Occupied  
France —  
facing the  
toughest test  
that a British  
pilot has  
ever had to  
experience!**

The year is 1943. As an RAF officer stranded in Occupied France you have one aim — to get back to Britain.

The only way to do this is to try to pass as a Frenchman, but if your French isn't good enough you risk capture and interrogation by the police or even the Gestapo.

Even the simplest tasks — from buying food to taking buses — place you at risk. And to add to your problems you've got limited funds: "Should I hitch a lift or take the train?", "Do I sell my belongings or get a job?"

Whatever you decide to do, time is short. And there are always people willing to denounce you . . .

French on the Run is that rare combination: A truly educational program that's also a thoroughly enjoyable game. This text adventure not only tests your grammar and vocabulary, but your knowledge of France and the French way of life.

And as your French improves the language problems get harder and the situations become progressively more dangerous. There are four routes to complete in sequence — you need the password from the last before attempting the next. The standard of French required is about O level, though on the last route it rises to just below A level.

**And there's a chance for you to try out the French you'll learn in practice:  
We are offering a FREE WEEKEND IN PARIS as a prize to the first person to  
get back to England alive, having broken a code near the end of the final route.**

*For teachers: French on the Run uses multi-choice questions with randomised distractors, all carefully chosen to illustrate linguistic points or points concerning things French. The program is meant for individual assessment, but can be used just as effectively for classroom work. A sealed envelope contains details of how the secret passwords are created.*

**DATABASE SOFTWARE**

**TO ORDER TURN TO THE FORM ON PAGE 53**



## Mission worth waiting for

**Program:** *Impossible Mission*  
**Price:** £9.95 (cassette)  
**Supplier:** US Gold, Units 2&3 Holford Way, Holford, Birmingham B6 7AX.  
**Tel:** 021-356 3388

PROFESSOR Elvin Atombender, well known computer genius and psychopath, has hacked into the military computers of the major nations.

Within six hours he will have deciphered the launch codes and started world war three. This is how long you are allocated to penetrate his underground stronghold and find the control centre.

The professor's hideaway is a 32 room complex criss-crossed by a network of lifts and it is in one such lift that your mission begins.

Exits to the left and right can be explored or you can press the down key and the lift will descend to the next level.

Your footsteps echo as you leave the lift and run along the corridors – running off the screen causes the adjoining room to be displayed. This is made up of a series of catwalks, some of which can be accessed using mini lifts.

All the rooms are patrolled by the

professor's robots which are sensitive to movement and armed with high voltage electrodes.

Using the lifts in the correct sequence will help you to avoid most confrontations with the metal menaces. When an encounter is unavoidable you must rely upon your athletic prowess and split second timing to somersault over the approaching robot.

To enter the professor's control room you need a nine digit code, doled out a digit at a time as you complete a series of sub-puzzles.

Puzzle sections are hidden in the furniture to be found in each of the rooms, as are passwords which can be entered into any of the professor's security terminals.

You search the furniture by standing in front of it and pressing the down key. A searching indicator is displayed, and you keep your finger on the key until the bar reaches zero.

At this point you will be told what you've found, but quite often you won't find anything.

All rooms contain at least one security terminal. Accessing this will enable you to immobilise the robots for a while or reset the lifts to their



original position.

The robots only suffer a temporary paralysis so be prepared to take evasive action at the first sign of their re-awakening.

To help you solve the sub-puzzles you have been provided with a pocket computer which can be used to manipulate the puzzle pieces that you have collected.

It has taken a few years to get here but the wait has been worthwhile. Impossible Mission is a very good conversion from the Commodore original.

Steve Brook

Sound.....	6
Graphics.....	9
Playability.....	9
Value for money.....	9
Overall.....	9

## Licensed to confuse

**Program:** *Operation Safras*  
**Price:** £7.95  
**Supplier:** Shards Software, Freepost, Ilford, Essex IG1 2BR.  
**Tel:** 01-514 4871

IT'S always difficult to follow an outstanding success and with Woodbury End Shards almost made a noose for its own neck – it was that good. Hence I have to admit that I am a little disappointed – perhaps expectedly – with Operation Safras.

"Your name is Rupert James Pettigrew. Your occupation, chartered accountant in the City of London. No particular vices or discernable marks. Single, aged 31, avid stamp collector ... in fact a totally boring individual."

Yet, as many readers will be aware, Pettigrew is of course a secret agent extraordinaire!

You begin the adventure standing by a disused lift and a quick sortie EAST reveals a fiver. Keep this lucky find as it provides a means of bribing information from a tramp later in the game.

Meanwhile, you soon discover a man standing in the shadows, but he's not there to make small talk. Ques-

tioning him elicits the response, "You can trust the triplets but beware of the one they call Iron Fist."

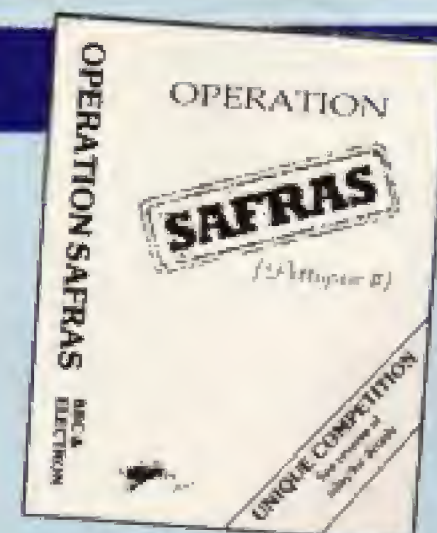
One word of warning – the clues in this adventure are as cryptic as we have come to expect from Steve Maltz, but are totally logical in retrospect.

The aim of the adventure is to rescue five fellow agents who have been secreted in various corners of Great Britain. Then you must use the information gathered to find the Safras sword.

An interesting transport system operates in this adventure, which I hope is expanded upon in future offerings. By pressing T you are presented with a map of this glorious country of ours, and using an unlimited rail ticket you are able to visit such tempting places as Carlisle or even Stockport!

In your travels you pick up various clues and hopefully unravel an intriguing mystery. If you succeed and register your name with Shards you could find that you are immortalised in their next blockbuster adventure.

I must admit that I found the wood in Newport a bit of a puzzle, but as usual X marked the spot. There was also an odd piece of head-banging to



overcome in Dundee!

However, it was pleasant to be reunited with old friends like Annie Gramm again, even if I was more than frustrated on occasions.

The adventure claims to be a sequel to Pettigrew's Diary but bears little similarity to that other Shards classic, either in make-up or plot. Don't get me wrong – I enjoyed Operation Safras as a very professional and at times thrilling adventure. Perhaps I'm really waiting for Return to Woodbury End!

Pendragon

Presentation.....	8
Atmosphere.....	7
Frustration factor.....	8
Value for money.....	8
Overall.....	8



## Quality package

**Program:** Power Pack  
**Price:** £9.95 (cassette)  
**Supplier:** Audiogenic Software, PO Box  
 88, Reading, Berkshire RG7 4AA.  
**Tel:** 0734 303663

POWER Pack is a compilation of previously released Audiogenic hits with the occasional new game thrown in for good measure – seven games in all, recorded over both sides of two cassettes.

Space Agent Zelda is the heroine of a very classy ladders game. Penetrate the 10 levels of a space ship and destroy its generator before the ship reaches Earth.

Space Ranger is a small screen version of that minor arcade hit Lunar Rescue. Teams of astronauts are stranded at five different sites on the moon – your mission is to fly down through an asteroid storm, landing at each site in turn to rescue the men.

Bug Eyes 2 is one of my all-time favourites and uses the biggest, brightest sprites you've ever seen. Space agent Zelda has been captured by the bug-eyed aliens and incarcerated in the depths of a desolate asteroid. As agent Starman you search for the 25 keys needed to free her.

Caveman Capers follows the exploits of Ogg the caveman as he strives to master a new form of transport – turtle power. Riding an uncooperative turtle you leap over pot

holes, avoid low-flying birds, duck beneath snakes hanging from trees and deduce how to jump the toadstools.

Ultron is a shoot-'em-up space game based loosely on the arcade game Gorf. As pilot of the Ultron space fighter you have to destroy three different waves of aliens before you come face to face with the mother-ship. Blast that and everything starts again but this time things are a little more hectic.

Wizzy is the tale of woe of a second rate wizard whose attic has been occupied by an unfriendly monster. The pages of his spell book are scattered throughout his mansion's 50 rooms, and without putting them together he can't cast a spell to banish his unwelcome guest. The graphics

have received very little thought and the game soon becomes tedious.

Wongo is the bomb disposal expert assigned to defuse terrorist bombs that have been planted along the great wall of China. The game is a crude Hunchback clone in which you leap over cannon balls and avoid low flying arrows while trying to render the bombs harmless.

With the exception of the last two titles all the software is of high quality and the package is excellent value for money.

Carol Barrow

Sound.....	8
Graphics.....	8
Playability.....	9
Value for money.....	9
Overall.....	8

## Memory galore with disc DFS

**Product:** Electron E00 DFS  
**Price:** £19.99 (3.5in disc)  
**Supplier:** ACP, 6 Aya House, High  
 Street, Chobham, Surrey GU24 8LZ.  
**Tel:** 0276 76545

WAY back in the February 1986 issue of *Electron User* I reviewed Advanced Computer Products' 1770 DFS. This is a rom which provides Plus 3 owners with a DFS compatible with that used in the BBC Micro.

Both the BBC B+ and Master use 1770 DFS's and these are also designed to be compatible with the old 8271 DFS in the original BBC model B.

With ACP's 1770 DFS Electron users have the ability to access BBC B, B+ and Master discs, which greatly increases the amount of software available to them. In fact the only stumbling block is that the Plus 3 uses 3.5in discs whereas 5.25 is the standard on the

BBC Micro. Still, you can always add a 5.25in second drive.

Now the same DFS is available on disc for Electron owners with ACP's sideways ram cartridge. Simply insert the cartridge in one of the Plus 1's sockets, boot up the disc and you've got a 1770 DFS.

If you want to know what ACP's DFS is like take a look at the February issue – the disc version is identical except that it runs in sideways ram and not rom.

So what are the advantages of having the rom on disc? After all it ties up the sideways ram preventing it from being used for anything else.

The advantage of the disc DFS is that it disables the ADFS and resets PAGE to &E00. This is the same as on an unexpanded Electron.

Compare this to &1D00 with just ADFS, &1900 with DFS and &1F00 with both ADFS and DFS. With ADFS

you lose nearly 4k of memory whereas with ACP's E00 DFS you don't lose any.

It avoids memory problems with long programs and the hassle of downloading software.

Programs which need PAGE to be at &E00 can still access the disc as normal. Downloaded software cannot do this and must select the tape filing system.

After \*FX200,2 and Control+Break the ADFS is restored, PAGE reset to what it was originally and you've got both ADFS and DFS.

ADFS can be selected with \*ADFS and DFS with \*DISC. This enables you to transfer your files to DFS discs. Simply select ADFS, load the file, select DFS and save it.

I thought the 1770 DFS was superb but the E00 DFS is even better! I can recommend it to all Plus 3 owners.

Roland Waddilove



## Over from Channel 4

**Program:** *Treasure Hunt*

**Price:** £9.95

**Supplier:** Macsen, 17 Nott Square, Carmarthen, Dyfed SA31 1PQ.

**Tel:** 0267 232508

MACSEN is a past master at converting successful TV programs for computers and in this case the target is the popular Channel 4 game show *Treasure Hunt*. The game comes with four sets of data covering South Devon, London, Anglesey and East Scotland.

The basic idea is simple. You are given a cryptic clue of the sort you might find in a crossword. This gives you the name of your next location and you must fly your helicopter there and collect another clue. This continues until you have solved all the problems.

For example, your first clue might be "Fly to an occidental bad actor or pig meat", which means a location in East London renowned for its bubbly football team.

When you arrive there you have to walk to "The beheaded Queen's field where Alf Garnet likes to go". Some of the clues have a third section to make them even harder.

You are not on your own in this

treasure hunt. Macsen has supplied you with a guide book for the three areas away from London and a map of the metropolis.

You'll need the guide book because a detailed knowledge of the local geography is required. The London map is nearly useless and I used one with a larger scale and much more information.

The only section I have completed is the one covering the London area and this required a quick peek into the computer memory to solve one clue which had me beaten.

In all there are 10 clues to find and to win you must find them in 30 minutes. Most of the time you will spend flying the helicopter, which takes an age to fly from place to place. You will need to be pretty slick with your typing to complete the task in the set time.

If you can't solve a clue you've had it. There is no help so all you can do is fly aimlessly until your time is up. If you can solve all 10 clues you get a final screen which is hardly worth looking at.

You can choose to have a tune playing during the game but I would hardly describe the collection of discordant squeaks as musical.

I actually quite enjoyed the game.



The map of the area you are working on is neatly drawn, and the puzzles were difficult to solve but not impossible. The program is crammed with geographical data and you can end up with a crowded map, full of places which you don't need to complete the task but which do add interest.

Without this extra geography, the clues could be written on a small piece of paper and I feel this is one of those occasions where the computer adds little to the idea.

However, if you get hooked, Macsen offers extra data tapes, with new treasures to hunt, for £5.95.

**Rog Frost**

<b>Sound</b> .....	<b>0</b>
<b>Graphics</b> .....	<b>7</b>
<b>Playability</b> .....	<b>5</b>
<b>Value for money</b> .....	<b>4</b>
<b>Overall</b> .....	<b>4</b>

## Gallons of gore

**Program:** *The Ferryman Awaits*

**Price:** £4.95

**Supplier:** Kansas City Systems, Unit 3, Sutton Springs Wood, Chesterfield.

**Tel:** 0246 850357

I MUST start by stating that I have not been greatly impressed by Kansas City's previous offerings, though they were better than a lot of the trivia posing as adventures which can be bought today.

However, *The Ferryman Awaits* is a marked improvement which will keep many of you up until the early hours of the morning trying to fathom out who, why, what or how.

Kansas boasts that this adventure contains about 60k of text – some of which admittedly is used in the introductory passage – and room descriptions are evocative if rather macabre.

Instructions are given in simple sentences, usually no longer than five words – certainly a welcome improvement on *Ring of Time*.

The adventure is one of the most gory I have come across and as such

should give immense pleasure to horror buffs.

It is also riddled with dry humour – try this offering: "You play Mold, son of Mold, grandson of Mold. Your previous job was that of Dung Heaper for the City of Furgle. One of the perks of the job was permission to sleep near the warmth of the dung pits! Your present employment is part-time human sacrifice!"

Unfortunately the adventure is also riddled with spelling mistakes – I noticed unfortunately and hideously on the first couple of screens. This is becoming all too common with recent releases.

Some of the problems are rather obscure and complicated, chiefly because the game has such a small vocabulary that you can do little except GET and DROP objects. It's a good idea to keep your eyes peeled for any hint that may lurk in the room descriptions.

Good imagery is created by more than six screens of introduction, which set out your task for you in black and white.

It seems you are doomed to wander

the wasteland of Juh which appears to be wholly peopled by demons, pirates, devil worshippers and deformed creatures.

You are apparently filling the role of hero-adventurer after you made frantic attempts to leave your last employment (I can't for the life of me understand why).

As the adventure opens, you find yourself lying across a stone table waiting to be sacrificed by a crazed priest. You are "magically paralysed from the neck down" and your only salvation is to utter the immortal word: Nimlax.

If you enjoy a plethora of blood and guts and can tolerate the "Righty oh, matey" response to almost all you do then this adventure is for you. Otherwise I suggest you try Database's *Magic Sword*!

**Pendragon**

<b>Presentation</b> .....	<b>5</b>
<b>Atmosphere</b> .....	<b>8</b>
<b>Frustration factor</b> .....	<b>8</b>
<b>Value for money</b> .....	<b>8</b>
<b>Overall</b> .....	<b>7</b>

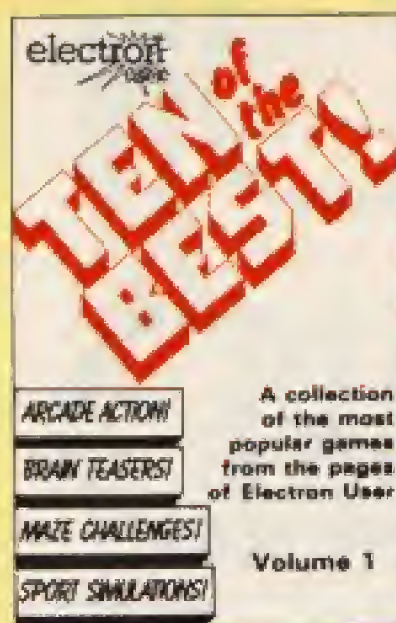


# More great Electron games

This month we introduce a new volume in our Ten of the Best series - 10 more games to give you many hours of fun and entertainment.

These three packages are crammed with the best games from the last 18 months of Electron User. As an added bonus a previously unpublished game has been added to each one - stunning machine code masterpieces from our technical wizard, Roland Waddilove.

So give yourself a treat... with the most popular games compilations we've ever produced.



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Jam Butty

## Volume 1

**Jam Butty:** Machine code simulation of high drama on a building site.

**Golf:** Play a round by yourself, or play against your pals.

**Haunted House:** Fight against all the odds to get out alive.

**Space Hike:** Another classic. Help the spacemen avoid marauding monsters.

**Park's Peril:** Help Parky through an invisible maze, racing against time.

**Rally Driver:** All the thrills of high-speed driving, with none of the risks.

**Alphaswap:** Your letters are in a twist. Can you put them in order?

**Knockout:** Fast and furious action as you batter down a brick wall.

**Money Maze:** Avoid ghosts and collect coins in an all-action arcade classic.

**Lunar Lander:** The traditional computer game specially written for the Electron.



Atom Smash

## Volume 2

**Atom Smash:** Machine code thrills as you help to save the world from destruction.

**Bunny Blitz:** Go egg collecting, but keep away from the proliferating rabbits.

**Castles of Sand:** Build castles - but beware the rising tide and hungry sandworms.

**Reaction Timer:** Test your reactions with this traffic lights simulation.

**Solitaire:** The Electron version of the age-old game of logic and patience.

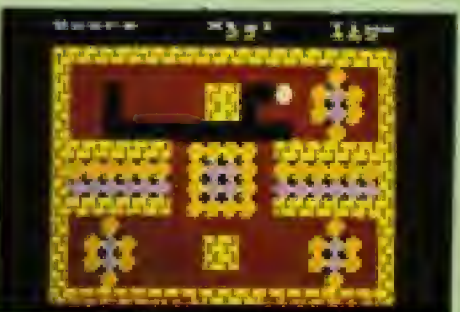
**Jumper:** Jump for your life in this exciting arcade action game.

**Break free:** Test your wits and reflexes in this popular classic ball game.

**Code Breaker:** Crack the code in a colourful if frustrating brain teaser.

**Parachute:** Save the plunging sky divers from a watery end.

**Star Fighter:** Attack the bandit ships in this fast-moving 3D punch-up.



Rockfall

## Volume 3

**Rockfall:** Come diamond mining in this fun packed game with its own screen designer.

**Karate Warrior:** Win your black belt in this gruelling test of karate skill.

**Grand Prix:** Battle your way into the lead in this tricky racing simulation.

**Invasion Force:** Can you survive wave after wave of relentlessly advancing aliens?

**Grebit:** Guide the frog across the busy road then across the fast-flowing river!

**Fruit Worm:** Steer the worm towards the fruit while avoiding rocks and its ever-growing tail.

**Manic Mole:** Watch out for melting platforms and conveyor belts in your quest for jewels.

**Skramble:** Fly your fighter fast and low over the landscape to penetrate enemy territory.

**Mr Freeze:** You'll need speed and strategy to reach the ice blocks before they melt away.

**Paint Roller:** Steer a speeding roller, run over paint pots but keep clear of the rocks.

TO ORDER TURN TO THE FORM ON PAGE 53



# ELECTRON KEYBOARD PLAYER

By  
**OLIVER  
BISHOP**

HERE is a utility that enables you to use your Electron as an electronic organ. The screen displays a large piano keyboard, a list of commands, the current mode – play, record or playback – the amount of memory free and the tempo.

An arrow at the bottom of the screen points to the note to be played and can be moved left and right using Z and X or player one analogue joystick left and right.

To play the note press Return and hold down S as well if you want it sharp, or F for flat. With joystick move up for sharp, down for flat and press fire to play the note.

Several additional commands are only available from the keyboard. Press P to enter play mode. You can move up and down the keyboard and play any of the notes.

Press R for record mode. Now anything you play will be recorded. There is room for 250 notes and the amount of memory left is constantly updated on screen.

Only the pitch of the notes is recorded, so you can pick out the tune at your own speed and play it back at the correct tempo.

Pauses can be included by pressing V. You'll need these if you want to play several notes of the same pitch, like the first two bars of Jingle Bells.

If you play a wrong note press Delete and a high pitched beep will tell you that the last note has been erased from memory. Press C to clear the whole tune from memory.

Use < and > to set the tempo and press B for automatic playback. A tempo of 10 is a note length of half a second, 20 is one second, 30 is one and a half seconds and so on.

You can press Escape at any time to stop the tune. It does not erase the tune memory.

An alternative way of playing back a recorded tune is selected by pressing K. Now the notes are played as you tap the spacebar so you can concentrate on your timing and rhythm.

Finally, Table 1 shows a summary of all the keys.





Description	Keyboard	Joystick
Arrow left	Z	left
Arrow right	X	right
Sharp	S	up
Flat	F	down
Sound note	Return	Fire
Delete note	Delete	Delete
Play mode	P	P
Record mode	R	R
Clear memory	C	C
Auto playback	B	B
Key playback	K	K
Pause	V	V
Tempo up	>	>
Tempo down	<	<

Table 1: A summary of all the commands

## VARIABLES

joy	Flag for joystick.
TT	Number of notes used so far.
SH	TRUE if note is a sharp.
FL	TRUE if note is a flat.
n()	Note in memory.
RR	Tempo.
REC	TRUE if recording.
so	Current note being played.
T	TRUE if note being sounded.
A,B	Position of arrow.

## PROCEDURES

blank	Deletes arrow from screen.
key	Draws the keyboard.
test	Tests to see what keys are being used.
play	Sounds the selected note.
playtune	Plays back a recorded tune.
clear	Clears the tune.
pt	Changes the tempo.

## Keyboard Player listing

```

10 REM Keyboard Player
20 REM By Oliver Bishop
30 REM And
40 REM Julian Bishop
50 REM Philip Jefferies
60 REM Jonathan Price
70 MODE4:PROCtitle
80 ON ERROR IF ERR=17 GO
TO 430 ELSE MODE 6:REPORT:P
RINT" at line ":ERR:END
90 IF A$="J" THEN joy=TR
UE ELSE joy=FALSE
100 TT=0
110 QQ=0
120 SH=FALSE:FL=FALSE
130 DIM n(255):RR=10
140 REC=FALSE
150 so=52
160 T=FALSE
170 MODE 4:VDU23,1,0;0;0;
0;
180 PROCpt
190 MOVE0,900:DRAW 600,90
0:DRAW 600,1000:DRAW 0,1000
:DRAW 0,900
200 MOVE0,904:DRAW 596,90
4:DRAW 596,996:DRAW 4,996:0
RAW 4,904
210 MOVE 0,800:DRAW 600,8
00:DRAW 600,400
220 MOVE 0,876:DRAW596,87
6:DRAW 596,400
230 MOVE 0,400:DRAW 0,800
:MOVE 4,400:DRAW 4,800
240 MOVE0,404:DRAW 1279,4
04:MOVE 0,408:DRAW 1279,400
250 MOVE 600,600:DRAW 127

```

```

9,600:DRAW 1279,400
260 MOVE 600,604:DRAW 127
4,604:DRAW 1274,400
270 VDU 4
280 PRINTTAB(22,3);"COMPU
TER"
290 PRINTTAB(22,5);"KEYBO
ARD"
300 PRINTTAB(22,7);"PLAYE
R.."
310 IF joy=TRUE PRINTTAB(
22,10);"Joysticks" ELSE PRI
NTTAB(22,10);"Keyboard"
320 VDU 5
330 VDU4:IF REC=TRUE THEN
PRINTTAB(2,2);"RECORD MODE
" ELSE PRINTTAB(2,2);"PLA
Y MODE "
340 RESTORE 1440:FOR A=5
TO 10:READ A$:PRINTTAB(1,A)
:A$
350 NEXT
360 PROCnotes
370 PROCkey
380 A=25:B=60
390 MOVE 0,0:DRAW 1279,0
400 VDU23,224,24,60,126,2
55,255,24,24,24
410 VDU 5:Q=75
420 MOVE25,60:PRINTCHR$(2
24)
430 REPEAT
440 SH=FALSE:FL=FALSE
450 IF joy=TRUE AND ADVAL
(1)/256=255 THEN PROCblank:
A=A-Q:GOTO 550
460 IF joy=FALSE AND INKE

```

```

Y(-98) THEN PROCblank:A=A-Q
:GOTO 550
470 IF joy=TRUE AND ADVAL
(1)/256=0 THEN PROCblank:A=
A+Q:GOTO 550
480 IF joy=FALSE AND INKE
Y(-67) THEN PROCblank:A=A+Q
:GOTO 550
490 IF joy=TRUE AND ADVAL
(2)/256=255 THEN SH=TRUE
500 IF joy=FALSE AND INKE
Y(-82) THEN SH=TRUE

```

This is one of hundreds of programs now available FREE for downloading on

**MicroLink**

```

510 IF joy=TRUE AND ADVAL
(2)/256=0 THEN FL=TRUE
520 IF joy=FALSE AND INKE
Y(-68) THEN FL=TRUE
530 PROCtest:IF T=TRUE TH
EN PROCplay:T=FALSE
540 UNTIL 0
550 IF A<0 THEN A=1225
560 IF A>1279 THEN A=25
570 MOVE A,B:VDU 224
580 PROCtest:IF T=TRUE TH
EN PROCplay:T=FALSE
590 UNTIL 0
600 :
610 DEF PROCblank
620 GCOL 0,0
630 MOVE A,B:VDU 224
640 GCOL 0,3

```

```

650 ENDPROC
660 :
670 DEF PROCkey
680 MOVE 0,80:MOVE 1279,8
0:PLOT 85,0,400:PLOT85,1279
,400
690 GCOL 0,0
700 DINT(40)
710 QW=0
720 RESTORE 1300
730 FOR A=0 TO 1279 STEP
75
740 IF A=150 OR A=375 OR
A=675 OR A=900 OR A=1200 TH
EN GOTO 760
750 PROCbkey(A)
760 READA$:VDU5:MOVE A+25
,130:PRINTA$
770 T(QW)=A
780 QW=QW+1
790 MOVE A,80:DRAW A,400
800 MOVE A+4,80:DRAW A+4,
400
810 PLOT69,A-4,80:PLOT 69
,A,80:PLOT 69,A+6,80
820 NEXT A
830 GCOL 0,3
840 ENDPROC
850 :
860 DEF PROCnote
870 FOR S=0 TO 10
880 IF A>T(S) AND A<T(S+1
) THEN so=N(S)
890 NEXT S
900 ENDPROC

```



# Keyboard Player listing


## From Page 19

```

910 DEFPROCnotes
920 RESTORE 990
930 DIMN(20)
940 FOR SS=0 TO 19
950 READ S
960 N(SS)=S
970 NEXTSS
980 ENDPROC
990 DATA 40,40,52,60,68,7
2,90,98,96,100,108,116,120,
128,136,144,146,156,164
1000 DEF PROCtest
1010 IF joy=TRUE THEN tes=
ADVAL(0) AND 3 ELSE tes=0
1020 IF tes=1 THEN T=TRUE
1030 IF tes=3 THEN T=TRUE
1040 IF joy=FALSE AND INKE
Y(-74) THEN T=TRUE
1050 IF INKEY=52 REC=TRUE
1060 IF INKEY(-100) AND RE
C=TRUE n(TT)=999:TT=TT+1:VD
U4:IF REC=TRUE PRINTAB(20,
15):"Memory Free: ";250-TT;
" ";SOUND 1,-15,0,1
1070 IF INKEY=56 REC=FALSE
1080 IF INKEY(-71) THEN PR
OConekey
1090 IF INKEY(-101) THEN P
ROCplaytune
1100 IF INKEY(-93) THEN PR
OCclear
1110 IF INKEY(-90) THEN VD
U4:TT=TT+1:PRINTAB(20,15):
"Memory Free: ";250-TT:SOUND
1,-15,200,2:VDU 5:IF TT<0 T
HEN TT=0:SOUND1,-15,20,2
1120 IF TT<1 THEN TT=1
1130 IF INKEY(-104) THEN R
R=RR+1:PROCpt
1140 IF INKEY(-103) THEN R
R=RR-1:PROCpt
1150 VDU4:IF REC=TRUE THEN
PRINTAB(2,2):"RECORD MODE
" ELSE PRINTAB(2,2):"PLA
Y MODE " :VDU5
1160 VDU5
1170 ENDPROC
1180 DEF PROCplay
1190 VDU4:IF REC=TRUE THEN
PRINTAB(2,2):"RECORD MODE
" ELSE PRINTAB(2,2):"PLAY
MODE "
1200 VDU4:IF REC=TRUE THEN
PRINTAB(20,15):"Memory Fr
ee: ";250-TT;" "
1210 IF TT=250 THEN REC=FA
LSE
1220 VDU5

```

PLAY MODE		COMPUTER KEYBOARD PLAYER..
P... Play		
R... Record		
<>... Alter Tempo		
K... Key Playback		
E... Auto Playback		
C... Clear Memory		
DEL Delete note		
V... Pause		
If you use keys: Z=left X=Right S=Sharp F=Flat RETURN=Play		Memory Free: 250 Tempo: 10



```

1230 PROCnote
1240 IF FL=TRUE so=so-4
1250 IF SH=TRUE so=so+4
1260 SOUND&0011,-15,so,10
1270 SH=FALSE:FL=FALSE
1280 IF REC=TRUE n(TT)=so:
TT=TT+1:IF TT=250 REC=FALSE
1290 ENDPROC
1300 DATA A,B,C,D,E,F,G,A,
B,C,D,E,F,G,A,B,C,D,E
1310 :
1320 DEF PROCplaytune
1330 VDU 4:PRINTAB(2,2):"
PLAYBACK MODE " :VDU 5
1340 FOR AP=0 TO 251
1350 IF n(AP)=0 GOTO1360
1360 IF n(AP)=999 THEN SOU
ND1,0,0,1:GOTO 1380
1370 SOUND1,-15,n(AP),RR
1380 NEXT AP
1390 VDU 4:PRINTAB(2,2):"
" :VDU 5
1400 REM (14 Spaces)
1410 VDU4:IF REC=TRUE THEN
PRINTAB(2,2):"RECORD MODE
" ELSE PRINTAB(2,2):"PLAY
MODE "
1420 VDU 5
1430 ENDPROC
1440 DATA "P...Play","R...
Record"
1450 DATA "<>...Alter Tempo
","K...Key Playback"
1460 DATA "E...Auto Playba
ck"

```

```

1470 DATA "C...Clear Memor
y","DEL Delete note"
1480 DATA "V...Pause"," "
" ","If you use keys:","Z=le
ft X=Right","S=Sharp
F=Flat"," RETURN=Play"
1490 DEF PROCclear
1500 FOR D=0 TO 250
1510 n(D)=0
1520 NEXT D
1530 TT=0
1540 VDU 4
1550 PRINTAB(20,15):"Memo
ry Free: ";250-TT;" "
1560 VDU 5
1570 ENDPROC
1580 DEF PROCpt
1590 IF RR<0 RR=0:ENDPROC
1600 IF RR>30 RR=30:ENDPRO
C
1610 VDU4
1620 PRINTAB(20,17):"Tempo:
";RR;" "
1630 VDU 5
1640 ENDPROC
1650 :
1660 DEF PROCckey(T)
1670 VDU 29,T:400;
1680 GCOL 0,0
1690 MOVE -20,0:MOVE 20,0:
PLOT 35,-20,-200:PLOT 35,20
,-200
1700 GCOL 0,3:PLOT69,-20,-
200:PLOT69,20,-200:GCOL 0,0
1710 VDU 29,0:0;

```

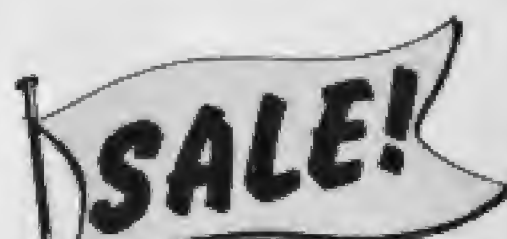
```

1720 ENDPROC
1730 DEF PROCtitle
1740 CLS
1750 PRINT""Computer Key
board Player"
1760 PRINT""BY OLIVER BISH
OP"
1770 PRINT""With help from
Julian,Philip & Jonathan"
1780 PRINT""You can use K
eyboard ( K )"
1790 PRINT""Or Analogue jo
ystick ( J )"
1800 PRINT""Which?";A$=GE
T$
1810 ENDPROC
1820 DEFPROConekey
1830 VDU 4:PRINTAB(2,2):"
ONE KEY PLAY " :VDU5
1840 FOR AP=0 TO 251
1850 IF n(AP)=000 GOTO1910
1860 IF n(AP)=999 GOTO1910
1870 IF n(AP)=0 THEN GOTO
1910
1880 *FX15,1
1890 REPEAT UNTIL GET=32:*
FX21,5
1900 REPEAT:SOUND1,-15,n(A
P),1:UNTIL INKEY(-99)=FALSE
1910 DOQ=n(AP):NEXT
1920 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 53.




**Bundle 1**  
8 issues of  
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**GRAND PRIX** Exciting race game. **DICER** A clever test of strategy. **MARCHING ORDER** Counting and ordering numbers. **FIND AND REPLACE** Useful editing program. **SECTOR EDITOR** Excellent disc utility. **TIMEPIECE** Superb graphics demonstration. **OXO** Game of cunning. **TRICIRC** A circle of triangles.

**February 1986**

**NECROMANCER** Superb text adventure. **GREBIT** Arcade action. **FAST BACKUP** Disc utility. **MACHINE CODE** How to write an arcade game. **TAPEDISC** More software transferring techniques. **SIDEWAYS RAM** Example program.

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# CARPET

BY  
ROG  
FROST

WE all know that the graphic capabilities of the Electron are superb. In this program these facilities are used to produce square patterns which end up looking like fireside rugs.

These effects are produced by moving into undocumented areas of Basic. The Electron User Guide lists GCOL 0 to GCOL 4, but it would be beyond the Acorn boffins to leave it at that.

In fact there are 256 different versions of GCOL, most of which produce vertical stripes.

These stripes are added on to the existing colours in numerous different ways and intricate patterns can be created.

In Carpet the computer is the main artist but you make some decisions. Firstly you can select any graphics mode and then choose the colours.

After that the Electron is away, but you can stop it at any time and invert all the colours before giving the computer its head again. The program contains full instructions.



## MAIN VARIABLES

A%	Used to select colour and GCOL
C%	Number of colours available.
D%( )	Actual colours chosen.
M%	Mode selected.
R%	Size of current square.

```

10 REM Carpet
20 REM By Rog Frost
30 REM (c) Electron User
40 ON ERROR IF ERR(>17) M
ODE6:REPORT:PRINT" at line
":ERL:END
50 CLEAR
60 MODE6:VDU19,0,4,0,23:
8202:0;0;0;
70 PROCinstruct
80 PROCselect
90 MODEM%:VDU23;8202:0;0
:0;
100 FORN%=1TOCX:VDU19,N%,
DX(N%);0;:NEXT
110 IF M%=2 FORN%=8TO15:V
DU19,N%,DX(N%-8);0;:NEXT
120 CLS
130 VDU29,630;500;
140 REPEAT:Q1=RND(127)
150 R1=510
160 MOVE0,0
170 FORAX=1TO127STEP2
180 GCOLAX+Q1,AXDIV2
190 MOVE0,R1:MOVE0,0:PLOT
85,R1,0:PLOT85,0,-R1:MOVE0,
0:PLOT85,-R1,0:PLOT85,0,R1
200 IF INKEY(-99)PROCpaus
e
210 R1=R1-8
220 NEXT
230 UNTIL 1=2
240 DEFPROCpause
250 REPEAT
260 IF INKEY(-74) GCOL4,1
28:CLS
270 UNTILINKEY(-1)
280 ENDPROC
290 DEFPROCinstruct
300 VDU20,1,24,39,0
310 PRINTTAB(13,2)"C A R
P E T"TAB(13,3)"*****
..red""2...green""3...yel
low""4...blue""5...magent
a""6...cyan""7...white"
420 FORN%=8TOCX:READCX:NE
XT
430 DATA2,4,8,0,2,4
440 DIM DX(CX)
450 PRINT"You have chose
n MODE ";M%:" and can""sel
ect ";CX:" colours."
460 VDU20,1,24,39,18
470 FORN%=1TOCX:PRINT"Se
lect number for colour ";N%
:IF N%=CXPRINT" (BACKGROUND
)";
480 INPUT DX(N%):NEXT
490 ENDPROC
320 PRINT""This program
will design a carpet""in t
wo, four or eight colours."
330 PRINT""At any time y
ou can hit space to""stop
the drawing."
340 PRINT""Return then i
nverts all colours."
350 PRINT""Press shift t
o restart the action."
360 REPEAT:INPUT""Which
Mode (0,1,2,4,5)",M%:UNTILM
1>-1 AND M%<6:IF M%=3 THEN3
60
370 CLS
380 ENDPROC
390 DEFPROCselect
400 PRINT""Colours are:-
410 PRINT"0...black""1.

```

This listing is included in this month's cassette tape offer. See order form on Page 53.





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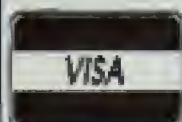
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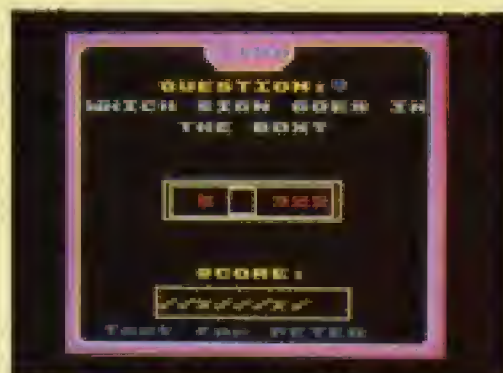
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**HANGMAN**  
Improve your child's spelling with this fun version of the popular game



**ODD MAN OUT**  
Find the word that does not fit – before your time runs out

**TO ORDER TURN TO THE FORM ON PAGE 53**



LAST month I left you with a mandala to muck about with and reinforce what you've learnt about coordinates and the graphics commands DRAW and MOVE.

Now we'll look at another graphics command, one that allows you to draw without a DRAW.

First put the Electron into a four colour mode with:

MODE 1

And now draw a line to (roughly) the centre of the screen with:

DRAW 500,500

By now you should be thoroughly familiar with the idea that the DRAW command moves the invisible graphics cursor from wherever it was to the point whose coordinates follow the DRAW. On the way the graphics cursor draws a line.

Since we'd just entered Mode 1, the cursor was at the bottom left of the screen, the origin. This has coordinates 0,0. After the:

DRAW 500,500

the cursor is now at the point 500,500 and any subsequent DRAWS will

take this as the start of the line.

Now let's go back to the original conditions and draw the same line. Only this time we won't be using DRAW.

Again, put the micro back into Mode 1 with:

MODE 1

and we're back where we started. The screen is clear and the cursor is positioned

at 0,0. Try:

PLOT 5,500,500

and see what happens. The result is exactly the same as with:

DRAW 500,500

So what is this PLOT all about?

In essence, it is a Basic command which controls what can be drawn on the graphics screen and how it is drawn.

As we'll see, it can do all sorts of interesting things, one of which is to get the Electron to draw a line.

The format for the PLOT command is:

PLOT code,xCoordinate,yCoordinate

The xCoordinate and yCoordinate values are just the same as the two coordinate values that we've previously used with MOVE and DRAW.

The code parameter is something else entirely, adding to the PLOT. In fact what the PLOT command actually achieves depends entirely on the value of code.

In our earlier example

code had the value 5. This tells the Electron to draw a line from wherever the graphics cursor is when the command is issued to the point with coordinates xCoordinate,yCoordinate.

Since these are both 500 and the cursor starts off at 0,0 a line is drawn (or plotted) from 0,0 to 500,500.

So PLOT with a code of 5 is exactly the same as DRAW. Try a few PLOT 5s with other coordinate values to convince yourself of this.

Inquiring minds may wonder if there's a PLOT equivalent to MOVE. There is. It's when PLOT has a code of 4.

To demonstrate this, recreate our original line with:

MODE 1

PLOT 5,500,500

or:

MODE 1

DRAW 500,500

if you want to be old-fashioned.

Whichever way you go about it, the graphics cursor is now lurking invisibly at 500,500.

It's probably getting

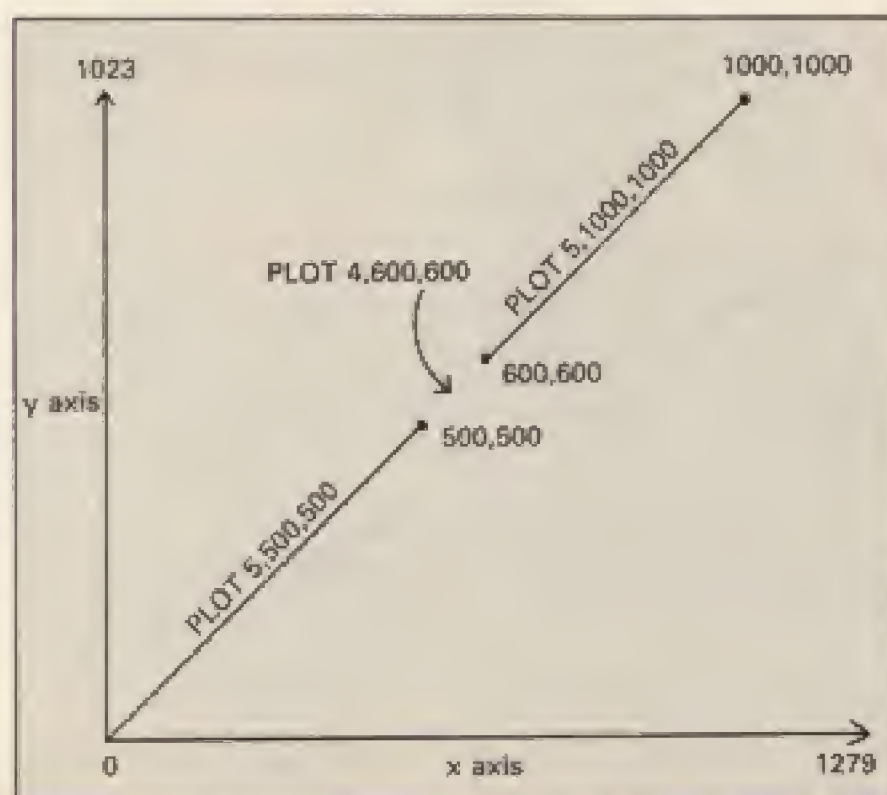


Figure 1: PLOT in action



# Graphics

## From Page 27

bored so give it something to do with:

```
PLOT 4,600,600
```

and you'll see nothing happen. In fact what has happened is that the Electron has obeyed the PLOT 4 and moved the graphics cursor to 600,600 without leaving a line behind it.

We could have used:

```
MOVE 600,600
```

to do the same job but as we're trying to unravel the PLOT command it would have been a bit daft!

Mind you, I say that the graphics cursor is at 600,600, but since it's invisible it could be anywhere, couldn't it?

So let's just indicate where it is (or was, after the

command) using:

```
PLOT 5,1000,1000
```

which, you will see, draws a line from 600,600 to 1000,1000.

The more pedestrian may use:

```
DRAW 1000,1000
```

for the same purpose but be warned. Soon PLOT will be doing things that MOVE and DRAW can't, so you might as well get used to it.

By this time you should

```
10 REM Program I
20 MODE 1
30 FOR loop=1 TO 20
40 DRAW RND(1000),RND(1000)
50 MOVE 0,0
60 NEXT loop
```

Program I

have a line across the screen with a little gap in it. Figure 1 shows the PLOTS behind the story so far.

Can you use the PLOT command to fill in the gap? It isn't hard. The answer is:

```
PLOT 4,500,500
```

```
PLOT 5,600,600
```

or:

```
PLOT 4,600,600
```

```
PLOT 5,500,500
```

where PLOT 4 is equivalent

```
10 REM Program II
20 MODE 1
30 FOR loop=1 TO 20
40 PLOT 5,RND(1000),RND(1000)
50 PLOT 4,0,0
60 NEXT loop
```

Program II

to MOVE and PLOT 5 equates to DRAW.

Notice that although both the above answers fill in the gap, they're not the same.

There's a subtle but important difference between them. Can you see it?

Well literally, no you can't, as it involves the invisible graphics cursor.

Ask yourself where it ends up after each PLOT 5.

And when you've figured that out, have a look at Programs I and II. Although they use different keywords, they do the same thing, as you'll find when you run them. If you're feeling adventurous, try other values for the code parameter in Program II.

● That's what we'll be doing next month as relatives get involved in the PLOTting.

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## Your ADC likes a bit of electrical peace and quiet

Part II of the Plus 1 series  
by JOE PRITCHARD

LAST month we looked at the basic concepts and ideas behind analogue to digital converters. This month we'll look at the Plus 1's analogue port in particular and examine its possibilities and limitations. In addition, we'll see how Basic's ADVAL function is used to read the port.

Figure 1 shows the analogue socket seen as it appears when looking at the back of the Plus 1.

Such a diagram is often called a pin out because it shows how the "pins" of the Analogue to Digital Converter (ADC) chip in the Plus 1 are taken to the outside world.

The connector used for the analogue input is a 15-pin socket referred to as a D-type, (you only have to look at it to see why) which receives a 15-way D plug.

Now let's look at what each of the pins does. Rather than just go through the pins from 1 to 15, I've grouped them according to their function.

Pin 1 is the +5 volt line which can be used to power things that are plugged into the analogue port.

However, it can't supply much current, so don't do silly things like connecting it to a 0V pin.

For those of you who might be tempted to try, this

would result in a short circuit, the 5V supply being asked to supply a very large current. It can't do this so the Plus 1 could be damaged.

Pins 2 and 3 are the 0 volt lines. This pair, plus the 5 volt line are taken from the digital circuitry inside the Electron and Plus 1.

These two pins are often called the digital ground pins, ground being the term used in electronics to refer to a wire or connection which is at 0V.

Pins 5 and 8 are more 0V lines and are called analogue ground lines.

Why do we have two different sets of 0V pins available? Well, it's all to do with electrical noise.

Just think of noise in electrical circuits as being similar to static on the radio, or the interference that you sometimes get on television

when a car goes past.

When logic signals go round a computer circuit they can generate some of this noise in electrical circuits to which they are connected or any circuit that is close by.

The digital ground lines are particularly susceptible to this specific form of noise and although the voltages involved are not big enough to cause any problems to the digital circuits, they can cause difficulties with analogue signals.

The voltage input to an ADC is always via two wires, one of these being a 0V line. The ADC effectively converts the voltage difference between the signal wire (which carries the voltage from the transducer in use) and the 0V line, into a digital output for the computer to read.

Therefore if the line used has a small changing

voltage on it the difference between the signal voltage and the 0V line will also change, causing a variation in the digital output.

To reduce these alterations in input voltage to the ADC, the analogue ground is supposed to be electrically quiet with little or no noise on it.

The noise on any ground used gives rise to something called jitter on the output of the ADC - the value returned alters slightly when there is a constant voltage input.

The practical result of all this is that we should always input our signals via the analogue ground if we have the chance.

Pins 11 and 14 carry a voltage of 1.8V. This is intended to be used as a

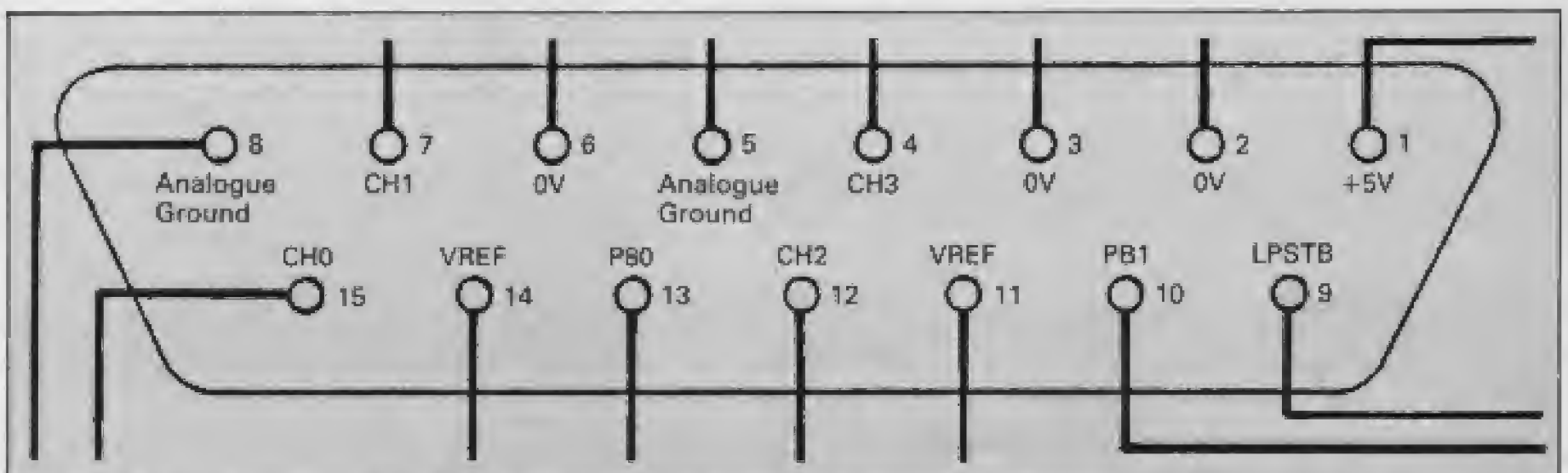


Figure 1: The analogue interface looking at the back of the Plus 1



# Hardware projects

## From Page 29

reference voltage; an input of 1.8V to the analogue interface will cause a maximum value to be output by the ADC.

You shouldn't try powering an electrical circuit from this signal, known as VREF (Voltage REFERENCE), as it can't supply enough current to be of use.

If you do intend to use it, as we will do later in the series, it should be used to supply voltage to a circuit that has an impedance of at least 10,000 ohms. Such circuits usually take the full VREF and return a fraction of it to an ADC input channel depending on the size of the physical parameter being measured.

Pins 10 and 13 are digital inputs and are typically used

to connect the joystick fire buttons to the computer. There'll be more on their use later in the series.

Now let's take a brief look at how Basic reads the analogue port.

The Plus 1 can have 4 input voltages connected to it – channels 0 to 3 – as follows:

Channel 0	Pin 15
Channel 1	Pin 7
Channel 2	Pin 12
Channel 3	Pin 4

The ADC converts each of these inputs in turn, taking 10mS each. Under normal circumstances therefore, a given channel is converted once every 40mS.

Each channel can be read from software using Basic's ADVAL(n) function where *n* is the channel number. Just to confuse matters here,

Basic sees the channels as being numbered 1 to 4.

When building any hardware project which uses the analogue port always remember:

- Don't connect the inputs to any voltage above 1.8 volts.
- Don't connect the inputs to any voltage less than 0 volts.
- Never bring mains voltages anywhere near the ADC input.

Failure to observe these conditions may cause damage to the Plus 1.

The first statement is clear enough; the ADC is reputed to be able to take up to 5V input without damage – don't risk it though.

There are no advantages in using such high input voltages. For many experiments VREF will provide the

voltages needed.

The second condition needs a little thought. "Less than 0 volts" simply means a negative voltage at the input relative to that on the analogue ground line.

The simplest way to damage your Plus 1 would be to take a battery and connect the positive terminal to 0V and the negative to the input pin of one of the channels.

The third statement should be very obvious – this would damage the Plus 1, the Electron and you!

● *That's it for now. Next month we get to the part you've all been waiting for – actually plugging something in to the analogue port. We'll build a couple of circuits so that we can cut our teeth on some simple analogue interfacing.* ■

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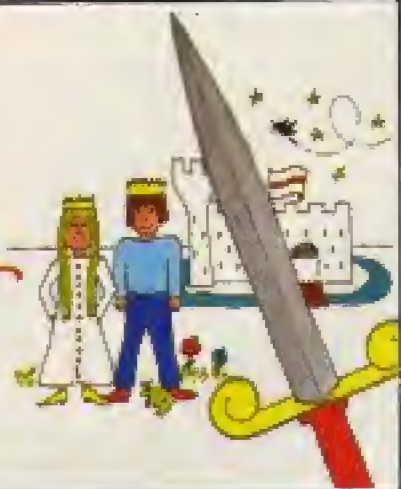
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# Barney's bugbear in the creepy castle

By Martin Cottle

BARNEY the bear has accidentally locked himself inside a maze of dungeons while exploring Baron Von Klink's creepy castle.

Fortunately there is a way out but he needs your help. There are several golden keys scattered throughout the 16 rooms and if you can help Barney collect them he can unlock the outer door to the maze.

The dungeons are inhabited by many ghosts and ghouls and these will try to frighten Barney to death.

Luckily he has his water pistol with him and these fiendish monsters hate water. A quick blast and they soon disappear!

Your task is to guide Barney through the maze collecting all the keys and return him safely to the start. The final door will then open allowing him to escape from the creepy castle.

## VARIABLES

HI%	High score.
A%,B%	Barney's coordinates.
d%	Direction Barney is facing.
key%	Number of keys collected.
L%	Number of lives left.
MAN\$( )	Barney's characters.

## PROCEDURES

main	Main program loop.
fire	Fire pistol.
screen	Draw the room.
doors	Open or close the doors.
end	Print the high score table.
asmb	Assemble the machine code.
setup	Define the graphics.

## CONTROLS

Z	= Left
X	= Right
*	= Up
?	= Down
Space	= Fire

Full listing starts  
on Page 34



## From Page 33

```

10 REM ----- Maze -----
20 REM By Martin Cottle
30 REM (c) Electron User
40 REM -----
50 ON ERROR IF ERA=17 GOT
080 ELSE MODE6:PRINT"":REP
ORT:PRINT" at line ":ERL:EN
D
60 DIM MAN$(2,2),key(16)
:H$="MARTIN":HIZ=100
70 MODE6:PROCasm:PROCse
tup
80 MODE4:PROCinst
90 MODE5:VDU23:8202:0:0:
0:19,3,6:0:
100 REPEAT
110 PROCinit
120 PROCscreen:PROCmain
130 PROCend
140 UNTILFALSE
150 DEFPROCmain
160 REPEAT:CALLkeys:az=AX
:bz=BX:ON?dir GOSUB 250,260
,270,280 ELSEGOTO190
170 ?&70=AX:??&71=BX:CALLc
heck:IF?scr=32 THEN 180 ELS
E IF?scr=128 PROCcollect EL
SE IF?scr=0 THEN PROCcb ELS
E IF?scr=129 ?medead=1
180 ?&70=AX:??&71=BX+1:CAL
lcheck:IF?scr=32 THEN 190 E
LSE IF?scr=128 PROCcollect
ELSE IF?scr=0 THEN PROCcb E
LSE IF?scr=129 ?medead=1
190 PROCnewscreen:COLOUR1
:PRINTTAB(ax,bx):SP$:TAB(ax
,bx):MAN$(dx,pz):CALLAlien
s:?random=RND(4):?(1&920+RN
D(15))=RND(4):IF?medead=1
PROCdead
200 IFINKEY=99 AND ?dir<3
PROCfire
210 UNTILLZ=0
220 *FX21,0
230 ENDPROC
240 DEFPROCcb:ON?dir GOSU
B 260,250,280,270:??dir=0:EN
DPROC
250 AX=AX-1:IFMX=1 dz=2:p
z=1:MX=2:RETURN ELSE dz=2:p
z=2:MX=1:RETURN
260 AX=AX+1:IFMX=1 dz=1:p
z=1:MX=2:RETURN ELSE dz=1:p
z=2:MX=1:RETURN

```

```

270 BX=BX-1:IFMX=1 pz=1:M
X=2:RETURN ELSE pz=2:MX=1:R
ETURN
280 BX=BX+1:IFMX=1 pz=1:M
X=2:RETURN ELSE pz=2:MX=1:R
ETURN
290 DEFPROCcollect:VDU31,
?&70,??&71,32:key=key+1:VD
U17,3,31,16,21:PRINT:key:
":FORIX=200TO283:SOUND1,-
15,IX,1:NEXT:key(roomX)=0:S
X=SX+10:VDU17,2,31,16,12:PR
INT:GX:ENDPROC
300 DEFPROCfire:IFdz=1 60
TO340
310 IFAX<=2 ENDPROC
320 SOUND1,1,60,5:DX=BX+1
:IX=AX-1:REPEAT:??&70=IX:??&7
1=DX:CALLcheck:IF?scr<>32 P
ROCchscr:IX=2 ELSE VDU31,IX
,DX,130:PROCpause(1):VDU31,
IX,DX,32
330 IX=IX-1:UNTILIX<2:END
PROC
340 IFAX>=13 ENDPROC
350 SOUND1,1,60,5:DX=BX+1
:IX=AX+1:REPEAT:??&70=IX:??&7
1=DX:CALLcheck:IF?scr<>32 P
ROCchscr:IX=13 ELSE VDU31,1
X,DX,130:PROCpause(1):VDU31
,IX,DX,32
360 IX=IX+1:UNTILIX>13:EN
DPROC
370 DEFPROCchscr:IF?scr=1
29 PROCloop
380 IF?scr=128 VDU31,IX,D
X,128:ENDPROC ELSE VDU31,IX
,DX,32:ENDPROC
390 DEFPROCloop:GX=0:REPE
AT:IF IX=? (ax+GX) AND DX=?
(ay+GX) AND ? (adead+GX)=0
THEN ? (adead+GX)=1:SOUND0
,-15,6,4:GX=GX+10:COLOUR2:P
RINTTAB(16,12):SX:needX=ne
edX-1:VDU31,IX,DX,140
400 GX=GX+1:UNTILGX=16:EN
DPROC
410 DEFPROCpause(p):TIME=
0:REPEATUNTILTIME>p:ENDPROC
420 DEFPROCnewscreen:finZ
=0:IFroomX=16 PROCchexit:EN
DPROC
430 IFneedX=0 AND doneX=0
PROCdoors:doneX=1 ELSE IFd
oneX=0 ENDPROC
440 IFAX>14 roomX=roomX+1

```

```

:AX=2:ax=2:finZ=1 ELSE IFAX
<2 roomX=roomX-1:AX=13:ax=1
3:finZ=1
450 IFBX<2 roomX=roomX-4:
BX=26:bx=26:finZ=1 ELSE IFB
X>27 roomX=roomX+4:BX=5:bx=
5:finZ=1
460 IFfinZ=1 finZ=0:PROCc
reen
470 ENDPROC
480 DEFPROCchexit
490 IFneedX=0 AND doneX=0
AND keyX<>16 PROCldoor:don

```

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```

eX=1 ELSE IFneedX=0 AND key
X=16 AND doneX=0 PROCdoors:
doneX=1
500 IF AX>14 PROCreset:PR
OCscreen:ENDPROC ELSE IFAX<
2 roomX=roomX-1:AX=13:finZ=
1
510 IFfinZ=1 finZ=0:PROCc
reen
520 ENDPROC
530 DEFPROCreset:VDU29,0,
31,15,0,12,26
540 PROCdh(3,3,"WELL DONE
",1,2):PROCdh(0,0,"You esc
aped from",3,2):PROCdh(0,12
,"the maze, but can",3,2):PR
OCdh(0,16,"you do it again?",
3,2):PROCdh(0,21,"BONUS:"
,2,1)
550 RESTORE560:FORIX=0TO2
1:READP,0:SOUND1,-15,P,0/2:
SOUND1,0,0,0:NEXTIX
560 DATA101,10,109,10,117
,10,121,20,101,20,121,10,11
7,10,121,10,129,20,109,20,1
09,10,117,10,121,10,137,10,
129,10,129,10,121,10,121,10
,117,10,109,10,117,10,101,4
0
570 PROCpause(200)
580 COLOUR3:PRINTTAB(6,22
)"100":oldSX=SX:REPEAT:GX=S
X+10:PRINTTAB(16,12):SX:50
UND1,-15,SXDIV10,2:PRINTTAB
(6,22):100-(SX-oldSX):" ":

```

```

PROCpause(25):UNTILSX=oldSX
+100
590 IFLX<5 LX=LX+1:PRINTT
AB(15+LX-1,29):MAN$(1,2):S
OUND1,1,60,2
600 PROCdh(2,26,"PRESS SP
ACE",1,2):PROCdh(2,28,"TO C
ONTINUE",1,2)
610 *FX21,0
620 REPEATUNTILGET=32
630 roomX=16:aliensZ=?al
iensX+2:needX=?aliensX:AX=2
:BX=5:keyX=-1:PROCcollect:1
F?aliensX>16 ?aliensX=16
640 FORIX=1TO16:key(IX)=1
:NEXT:SOUND1,-15,41,2:SOUND
1,-15,69,6:SOUND1,-15,41,2:
SOUND1,-15,69,10
650 ENDPROC
660 DEFPROCscreen
670 VDU29,0,31,15,0,12,26
680 GCOL0,3:ON roomX GOSU
B 730,740,730,750,760,770,7
80,740,790,800,810,770,820,
830,790,840
690 PROCdoors
700 MX=2:COLOUR1:PRINTTAB
(AX,BX):MAN$(dx,pz):PROCAl
iens:?dir=0:needX=?aliensX:
doneX=0
710 IFkey(roomX)=1 REPEAT
:??&70=RND(12)+1:??&71=RND(19
)+6:CALLcheck:UNTIL?scr=32:
VDU31,??&70,??&71,120
720 ENDPROC
730 PROC1:PROC2:PROC3:PRO
C4:VDU23,129,40,16,84,56,25
4,56,84,0:RETURN
740 PROC5:PROC6:PROC7:PRO
C8:VDU23,129,36,24,60,90,15
4,165,195,0:RETURN
750 PROC5:PROC6:PROC9:PRO
C10:VDU23,129,129,66,36,24,
24,60,66,129:RETURN
760 PROC11:PROC12:PROC13:PR
OC8:VDU23,129,129,66,36,90
,189,90,255,153:RETURN
770 PROC11:PROC12:PROC14:
PROC10:VDU23,129,129,90,60,
90,126,60,90,129:RETURN
780 PROC11:PROC15:PROC13:PR
OC4:VDU23,129,126,255,219,
255,102,60,102,195:RETURN
790 PROC11:PROC15:PROC14:
PROC17:VDU23,129,60,66,165,
165,153,255,66,60:RETURN

```



```

800 PROC5:PROC2:PROC7:PRO
C4:VDU23,129,24,68,126,165,
153,126,68,24:RETURN

```

```

810 PROC16:PROC12:PROC7:P
ROC8:VDU23,129,68,126,219,2
55,195,219,126,68:RETURN

```

```

820 PROC1:PROC2:PROC14:PR
OC17:VDU23,129,28,28,62,187
,62,28,42,73:RETURN

```

```

830 PROC16:PROC12:PROC9:P
ROC18:VDU23,129,68,66,165,1
29,165,153,66,68:RETURN

```

```

840 PROC5:PROC2:PROC9:PRO
C17:VDU23,129,68,126,255,15
3,219,255,255,219:RETURN

```

```

850 DEFPROC1:MOVE8,499:DR
AW8,999:DRAW499,999:MOVE123
,499:DRAW123,876:DRAW499,87
6:MOVE8,999:DRAW123,876:END
PROC

```

```

860 DEFPROC2:MOVE587,999:
DRAW1819,999:DRAW1819,593:D
RAW896,569:DRAW896,876:DR
AW587,876:MOVE1819,999:DR
AW896,876:ENDPROC

```

```

870 DEFPROC3:MOVE8,0:DR
AW377,0:DRAW489,123:DRAW123,1
23:DRAW8,0:DRAW8,499:MOVE12
3,123:DRAW123,499:ENDPROC

```

```

880 DEFPROC4:MOVE896,123:
DRAW689,123:DRAW641,0:DR
AW1819,0:DRAW1819,425:DR
AW896,449:DRAW896,123:DR
AW1819,0:ENDPROC

```

```

890 DEFPROC5:MOVE123,876:
DRAW123,569:DRAW8,593:DR
AW8,999:DRAW123,876:DR
AW499,876:MOVE499,999:DR
AW8,999:ENDPROC

```

```

900 DEFPROC6:MOVE587,999:
DRAW1819,999:DRAW1819,499:M
OVE896,499:DRAW896,876:DR
AW587,876:MOVE1819,999:DR
AW896,876:ENDPROC

```

```

910 DEFPROC7:MOVE8,0:DR
AW377,0:DRAW489,123:DRAW123,1
23:DRAW123,449:DRAW8,425:DR
AW8,0:DRAW123,123:ENDPROC

```

```

920 DEFPROC8:MOVE896,123:
DRAW689,123:DRAW641,0:DR
AW1819,0:DRAW1819,499:MOVE896
,499:DRAW896,123:DRAW1819,0:
ENDPROC

```

```

930 DEFPROC9:MOVE8,0:DR
AW8,425:DRAW123,449:DRAW123,1
23:DRAW8,0:DRAW499,0:MOVE12

```

```

3,123:DRAW499,123:ENDPROC

```

```

940 DEFPROC10:MOVE587,123
:DRAW896,123:DRAW896,499:M
OVE587,0:DRAW1819,0:DR
AW1819,499:MOVE1819,0:DR
AW896,123:ENDPROC

```

```

950 DEFPROC11:MOVE8,499:D
RAW8,999:DRAW377,999:DR
AW489,876:DRAW123,876:DR
AW123,499:MOVE8,999:DR
AW123,876:ENDPROC

```

```

960 DEFPROC12:MOVE896,876
:DRAW689,876:DRAW641,999:DR
AW1819,999:DRAW896,876:DR
AW896,499:MOVE1819,999:DR
AW1819,499:ENDPROC

```

```

970 DEFPROC14:MOVE8,499:D
RAW8,0:DRAW499,0:MOVE499,12
3:DRAW123,123:DRAW123,499:M
OVE8,0:DRAW123,123:ENDPROC

```

```

980 DEFPROC15:MOVE896,876
:DRAW896,569:DRAW1819,593:D
RAW1819,999:DRAW896,876:DR
AW689,876:DRAW641,999:DR
AW1819,999:ENDPROC

```

```

990 DEFPROC16:MOVE123,876
:DRAW123,569:DRAW8,593:DR
AW

```

```

896,449:DRAW896,123:DR
AW587,123:MOVE1819,0:DR
AW896,123:ENDPROC

```

```

1010 DEFPROC1door:6COL3,1:
MOVE8,429:DRAW8,589:DR
AW123,565:DRAW123,453:DR
AW8,429:MOVE123,481:DR
AW8,478:MOVE123,589:DR
AW8,589:MOVE123,537:DR
AW8,547:6COL3,2:VDU5:M
OVE48,478:VDU141,4:ENDPROC

```

```

1020 DEFPROCrdoor:6COL3,1:
MOVE896,453:DRAW896,565:DR
AW1819,589:DRAW1819,429:DR
AW896,453:MOVE896,481:DR
AW1819,478:MOVE896,589:DR
AW1819,547:6COL3,2:VDU5:M
OVE938,568:VDU141,4:ENDPROC

```

```

1030 DEFPROCudoor:6COL3,1:
MOVE385,999:DRAW633,999:DR
AW681,876:DRAW417,876:DR
AW385,999:MOVE463,876:DR
AW439,999:MOVE589,876:DR
AW589,999:MOVE555,876:DR
AW579,999:6COL3,2:VDU5:M
OVE481,932:VDU141,4:ENDPROC

```

```

1040 DEFPROCddoor:6COL3,1:

```

```

60SUB1878,1088,1078,1098,11
88,1118,1128,1088,1138,1148
,1158,1118,1168,1178,1138,1
188

```

```

1060 ENDPROC

```

```

1070 PROCddoor:PROCrdoor:R
ETURN

```

```

1080 PROCddoor:PROC1door:R
ETURN

```

```

1090 PROC1door:RETURN

```

```

1100 PROCudoor:PROCddoor:R
ETURN

```

```

1110 PROCudoor:RETURN

```

```

1120 PROCudoor:PROCddoor:P
ROCrdoor:RETURN

```

```

1130 PROCudoor:PROCrdoor:R
ETURN

```

```

1140 PROCddoor:PROC1door:P
ROCrdoor:RETURN

```

```

1150 PROCudoor:PROCddoor:P
ROC1door:RETURN

```

```

1160 PROCrdoor:RETURN

```

```

1170 PROCudoor:PROC1door:R
ETURN

```

```

1180 PROC1door:PROCrdoor:R
ETURN

```

```

1190 DEFPROCdead:COLOUR3:P
RINTTAB(AX,BX):DEAD$:FORIX
=1TO25:VDU19,0,1,0:;SOUND0,
-15,4,1:VDU19,0,0,0:;NEXT:P
RINTTAB(AX,BX):SP$;

```

```

1200 LX=LX-1:PRINTTAB(15+L
X,29):SP$;AX=2:BX=5:PROCsc
reens?medeadX=0:ENDPROC

```

```

1210 DEFPROCinit
1220 ?scr=0:?dir=0:?aliens
X=5:?medeadX=0

```

```

1230 PROCdh(16,3,"MAZE",2,
3):PROCdh(16,9,CHR$131+CHR$
132+CHR$133+CHR$134,1,2):PR
INTTAB(16,12):"0":PROCdh(1
6,18,"KEYS",2,1):PRINTTAB(1
6,21):"0":PROCdh(16,26,"MEN
":2,3)

```

```

1240 FORIX=16TO19:COLOUR1:
PRINTTAB(IX,29):MAN$(1,2):;
NEXT

```

```

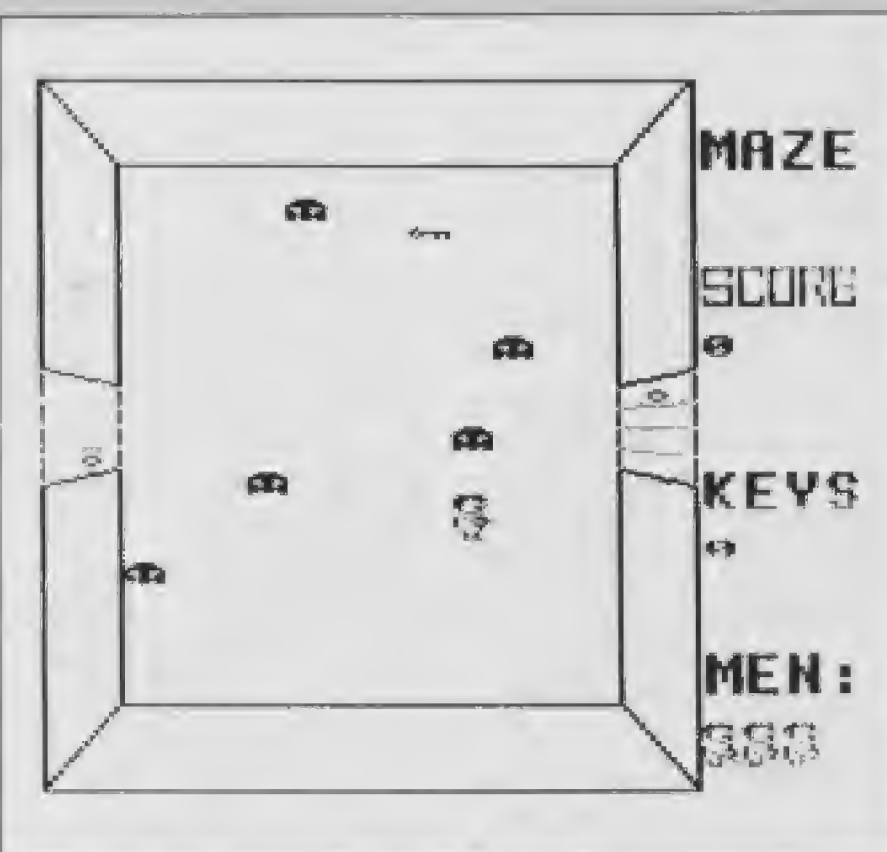
1250 dx=1:px=2:finX=0:room
X=16:AX=2:BX=5:LX=5:MX=1:SX
=0:FORIX=1TO16:key(IX)=1:NE
XT:keyX=0

```

```

1260 SOUND1,-15,4,1,2:SOUND
1,-15,69,6:SOUND1,-15,41,2:
SOUND1,-15,69,10

```



```

8,999:DRAW377,999:DR
AW489,876:DRAW123,876:DR
AW8,999:ENDPROC

```

```

1000 DEFPROC17:MOVE587,0:D
RAW1819,0:DRAW1819,425:DR
AW385,876:DRAW417,123:DR
AW6

```

```

81,123:DRAW633,0:DR
AW385,0:MOVE463,123:DR
AW439,0:MOVE5
89,123:DRAW589,0:MOVE555,12
3:DRAW579,0:6COL3,2:VDU5:M
OVE561,88:VDU141,4:ENDPROC

```

```

1050 DEFPROCdoors:ONroomX

```



## From Page 35

```

1270 ENDPROC
1280 DEFPROCsetup
1290 ENVELOPE1,129,-15,-8,
-3,18,18,18,126,0,0,-126,12
6,126
1300 VDU23,128,0,0,64,191,
165,69,0,0
1310 VDU23,129,129,98,60,9
0,126,60,98,129
1320 VDU23,130,24,24,0,0,0
,0,0,0
1330 VDU23,131,126,66,64,1
26,2,66,126,0
1340 VDU23,132,251,138,138
,138,138,138,251,0
1350 VDU23,133,239,40,40,4
7,41,40,232,0
1360 VDU23,134,190,162,160
,62,32,162,190,0
1370 VDU23,135,56,124,84,8
4,124,40,40,56,23,136,146,1
90,180,40,24,180,190,130:DE
AD$=CHR$135+CHR$8+CHR$10+CH
R$136
1380 VDU23,140,137,86,33,2
82,37,72,145,37
1390 VDU23,141,0,0,24,36,3
6,24,0,0
1400 VDU23,151,124,254,228
,194,204,68,56,68,23,152,17
4,147,142,132,68,40,40,60:M
AN$(1,1)=CHR$151+CHR$8+CHR$
10+CHR$152
1410 VDU23,153,132,142,163
,150,132,82,120,247:MAN$(1,
2)=CHR$151+CHR$8+CHR$10+CH
R$153
1420 VDU23,154,62,127,35,6
7,51,34,28,34,23,155,117,20
1,113,33,34,20,20,60:MAN$(2
,1)=CHR$154+CHR$8+CHR$10+CH
R$155
1430 VDU23,156,33,113,197,
121,33,74,85,239:MAN$(2,2)=
CHR$154+CHR$8+CHR$10+CHR$15
6
1440 SP$=CHR$32+CHR$8+CHR$
10+CHR$32
1450 ENDPROC
1460 DEFPROCasmb:scr=k72:d
ir=k73:aliensX=k74:xstoreX=
k75:col1X=k76:col2X=k77:med
eadX=k78:randomX=k79:axX=k9
80:ayX=k910:adirX=k920:adea

```

```

dX=k930:os=kFFEE
1470 FORpass=0TO2STEP2:PX=
k5200
1480 IOPTpass
1490 .dh STA&80:STX&89:STY
&8A:LDA#10:LDX#&80:LDY#0:JS
R&FFF1
1500 LDA#23:JSR0s:LDA#255:
JSR0s:LDA#81:JSR0s:JSR0s:LD
A#82:JSR0s:JSR0s:LDA#83:JSR
0s:JSR0s:LDA#84:JSR0s:JSR0s
:LDA#17:JSR0s:LDAcol1X:JSR0
s:LDA#31:JSR0s:LDA#89:JSR0s
:LDA#8A:JSR0s:LDA#255:JSR0s
1510 LDA#23:JSR0s:LDA#255:
JSR0s:LDA#85:JSR0s:JSR0s:LD
A#86:JSR0s:JSR0s:LDA#87:JSR
0s:JSR0s:LDA#88:JSR0s:JSR0s
:LDA#17:JSR0s:LDAcol2X:JSR0
s:LDA#31:JSR0s:LDA#89:JSR0s
:LDA#8A:ADC#1:JSR0s:LDA#255
:JSR0s:RTS
1520 .inkey LDY#&FF:LDA#&8
1:JSR&FFF4:TXA:RTS
1530 .keys LDY#&9E:JSRinke
y:BEQnleft:LDA#1:STAdir
1540 .nleft LDY#&8D:JSRinke
y:BEQnright:LDA#2:STAdir
1550 .nright LDY#&87:JSRin
key:BEQnup:LDA#3:STAdir
1560 .nup LDY#&97:JSRinke
y:BEQndown:LDA#4:STAdir
1570 .ndown RTS
1580 .check LDA#31:JSR0s:L
DA#70:JSR0s:LDA#71:JSR0s:LD
A#135:JSR&FFF4:STXscr:RTS
1590 .aliens LDYaliensX:LD
A#17:JSR0s:LDA#21:JSR0s
1600 .loop LDA#deadX,X:CM
P#1:BEQnext:LDA#31:JSR0s:LDA
axX,X:JSR0s:LDAayX,X:JSR0s:
LDA#32:JSR0s:LDA#dirX,X:CM
P#1:BEQleft:CMF#2:BEQright:CM
P#3:BEQup:CMF#4:BEQdown
1610 .print LDA#31:JSR0s:L
DAaxX,X:JSR0s:LDAayX,X:JSR0
s:STXxstoreX:LDA#135:JSR&FF
F4:STXscr:LDYxstoreX:LDAscr
:CMF#32:BNEhit:LDA#129:JSR0
s:dec DEX:TXA:CMF#0:BEQend
loop:JMPloop
1620 .next JMP dec
1630 .left DECaxX,X:LDAaxX
,X:JMPprint
1640 .right INCaxX,X:LDAax
X,X:JMPprint

```

```

1650 .up DECayX,X:LDAayX,X
:CMF#6:BNEdown:JMPprint
1660 .down INCayX,X:LDAayX
,X:JMPprint
1670 .endloop JMPreturn
1680 .hit LDAscr:CMF#150:B
CShadit
1690 .hit2 LDYadirX,X:LDAr
andomX:STAdirX,X:TYA:CMF#1
:BEQright:CMF#2:BEQleft:CM
F#3:BEQdown:CMF#4:BEQup
1700 .hadit LDA#1:STAmdea
dX:JMPhit2
1710 .return RTS
1720 INEXT
1730 ENDPROC
1740 DEFPROCaliens:COLOUR2
1750 FORloopX=1TO?aliensX
1760 ?&70=RND(4)+5:??&71=R
ND(11)+8:CALLcheck:IF?scr<>3
2 THEN 1760
1770 VDU31,??&70,??&71,129:
(axX+loopX)=??&70:?(ayX+loop
X)=??&71:?(adeadX+loopX)=0:
(adirX+loopX)=RND(4)
1780 NEXT:ENDPROC
1790 DEFPROCdh(x,y,a$,c1,c
2):LOCALK:FORK=1TOLEN(a$):A
X=ASC(MID$(a$,K,1)):X1=x+K-
1:Y1=y:col1X=c1:col2X=c2:
CALLdh:NEXT:ENDPROC
1800 DEFPROCinst:VDU23,1,0
;0;0;0;19,0,4;0;
1810 PROCdh(10,1,"MAZE by
Martin Cottle",1,1)
1820 PRINTTAB(0,4)"Can you
help Barney get out of the
maze?" " You must guide hi
e safely through all the 1
6 rooms whilst destroying a
ll the creatures you meet
on the way. "
1830 PRINT" Before the doo
rs in each room will openyo
u must shoot all the creatu
res in it. Touching one of
these creatures means ins
tant death and you will los
e one of your five lives."
1840 PRINT" On your way yo
u must also collect all th
e keys in the maze. Without
all of thekeys you cannot
open the exit, which is fou
nd in the room in which you
start, andescape from the m

```

```

aze."
1850 PROCdh(16,20,"CONTROL
S",1,1):PRINTTAB(16,22)****
*****
1860 PRINTTAB(0,23)" 1 -
LEFT X -
RIGHT "" : - UP
/ - DOWN ""
SPACE - FIRE"
1870 PROCdh(5,29,"PRESS SP
ACE TO ENTER THE MAZE.",1,1
)
1880 REPEATUNTILGET=32:FX
21,0
1890 ENDPROC
1900 DEFPROCend:PROCdh(3,1
6,"GAME OVER",2,1):PROCTun
e:PROCpause(300):BCOL0,0:FO
RI1=0TO639STEP8:MOVE1X,0:DR
AW1X,1000:MOVE1279-1X,0:DR
AW1279-1X,1000:SOUND17,-15,(
1X+1)DIV3,1:NEXT
1910 PROCdh(4,3,"MAZE SCOR
ES",1,2):PROCdh(4,5,"=====
====",3,2)
1920 VDU20,0,31,19,8:IFSX)
HI:PROCinput
1930 PROCdh(1,3,"The high
score is:",2,3):PRINTTAB(0,
7):HI:
1940 PROCdh(1,10,"By:",1,3
):PROCdh(4,10,H$,2,1)
1950 PROCdh(4,16,"PRESS SP
ACE",1,2):PROCdh(5,19,"TO R
EPLAY",1,2)
1960 REPEATUNTILGET=32:VDU
26,12:FX21,0
1970 ENDPROC
1980 DEFPROCinput:PROCdh(0
,2,"PLEASE ENTER NAME",3,2)
:INPUTTAB(0,6):H$
1990 IFLEN(H$)>16 H$=LEFT$
(H$,16)
2000 HI=5X:VDU12:ENDPROC
2010 DEFPROCtune:RESTORE20
20:FORIX=0TO8:READP,D:SOUND
1,-15,P,D:SOUND1,0,0,0:NEXT
:ENDPROC
2020 DATA33,20,5,20,5,10,1
3,10,17,10,13,10,5,10,1,10,
5,30

```

This listing is included in this month's cassette tape offer. See order form on Page 53.



Product: \*Trek  
 Price: £17.50  
 Supplier: Slogger, 107,  
 Richmond Road, Gil-  
 lingham, Kent.  
 Tel: 0634 52303.

ONE of the most powerful disassemblers currently available for the Electron is \*Trek, enabling you to explore the innermost confines of your micro's memory.

As the program is supplied on rom, you'll need some form of sideways rom expansion board or cartridge to use it.

Typing \*HELP TREK prints a help screen displaying all the commands understood by the rom and is shown in Figure 1.

The disassembler is entered on power up if there are no other language roms of higher priority or by typing \*TREK.

Initially eighty column Mode 3 is selected and you are presented with a list containing the name, number and status of all roms present.

The status information tells you which processor type each rom is intended for - normally on the Electron this is the 6502.

It will also tell you whether it will work across the Tube, for those lucky enough to have a second processor, and whether they are either language or service roms.

Below this display you are prompted for the start and finishing addresses of the area of memory to be disassembled.

An offset address can be given enabling programs meant for sideways roms which start at &8000 to be placed in a lower area of memory before being disassembled.

If the start address lies between &8000 and &BFFF, the area of memory reserved for paged roms, \*Trek will ask for the rom you wish to disassemble.

You may select any mode but if any other than 80 column Modes 0 or 3 is selected both Ascii and text

outputs are disabled.

However, these can be re-enabled at any time using the control keys, which I'll come to later.

Before the disassembly begins \*Trek asks if you want to send the output to a printer. It is quite intelligent and if you answer yes it checks to see if a printer is connected and on line before proceeding.

The printer can be turned on or off, as can paged mode during disassembly using the normal Basic control keys - B, C, N and O respectively.

Ascii output can be turned on and off with Control+S and A - not A and S as stated in the manual.

During disassembly the Tab key, according to the manual, allows you to input a new start and finish

address. Unfortunately the Electron doesn't have a Tab key.

However, the BBC Micro does and it produces the Ascii code 9. Control+I on the Electron produces the same code and fortunately has the same effect.

This is a far from standard disassembler. What makes it unique is its impressive ability to comment on the code as it disassembles. Take a look at Figure 11 to see what I mean.

The operating system commands such as osbyte, osword, osfind and osfile are all identified and decoded.

Each is followed by a brief note stating its function, and the function of each memory location accessed is also given.

These interpretations may not be strictly accurate,

however, since it is possible to write in quite obscure ways disguising the true function of the code.

When disassembling the Basic rom the entry point for Basic keywords like INKEY\$, RND, SOUND and so on are flagged.

The bytes following a BRK instruction are treated as Ascii text characters and are printed out until another BRK is encountered. This is how Basic stores its error messages.

The contents of an address are displayed if used by an indirect jump. This is useful when following operating system calls through jump vectors.

However, some roms alter these during use and therefore their contents may not

### \*TREK the Complete Disassembler 1.06 (C) Tornado Software 1986

Type \*TREK for the Disassembler  
 \*MEMORY <adr> - BASIC location use  
 \*OSBYTE <adr> - OSBYTE call info  
 \*OSWORD <adr> - OSWORD call info  
 \*OSFIND <adr> - OSFIND call info  
 \*OSFILE <adr> - OSFILE call info

Syntax: \*MEMORY ddddd (\*MEMORY &hhhh)  
 where d=decimal, h=hex digit

During Disassembly:  
 ^B Printer on ^C Printer off  
 ^A ASCII on ^S ASCII off  
 ^L Text on ^K Text off  
 ^N Page mode on ^O Page mode off  
 ^U Screen mode (follow with 0-7)  
 L Enter Labels T Enter Tables  
 \* Enter system command  
 ^I Re-enter start & end addresses  
 SPACE Fast/Slow Disassembly

Figure 1: The \*Trek help screen



# Rom review

## From Page 37

be accurate.

In addition to commenting on code \*Trek allows you to add labels – up to six characters long – to the output.

These can be used to indentify program statements, loops, branches or subroutine entry points.

They can be loaded from or saved to a file enabling you to build up a complete annotated disassembly listing of a machine code program.

Areas of memory used for data or text storage can be output as a hex/Ascii dump. The start and end points of these areas or tables can be saved along with the labels.

You can ask \*Trek to comment without entering the disassembler, using star commands from Basic.

Memory will tell you what a particular memory location is used for and osbyte, osword, osfind and osfile

will provide information on these operating system calls.

Unfortunately \*Trek does contain a few irritating bugs – for instance Control+K

(intended to disable text output) and certain star commands crashed it.

Bugs aside, this package does seem to have a lot going for it. It is easy to use,

thoroughly comprehensive and even "intelligent".

\*Trek is an extremely useful and versatile tool and a virtual necessity for the machine code programmer.

0000	A9 13	LDR R19			
0002	20 F4 FF	JSR \$FFFF4	OSBYTE (Wait for vertical sync)		
0005	A5 02	LDR R02	Vartop low		
0007	85 70	STR R70	Reserved for User		
0009	A5 03	LDR R03	Vartop high		
000B	85 71	STR R71	Reserved for User		
000D	84 00	LDR R00	Text pointer 1 offset		
000F	31 00	LDR (R00),Y	Text pointer 1 low		
0011	85 72	STR R72	Reserved for User		
0013	A9 01	LDR R01			
0015	85 20	STR R20	Trace flag		
0017	A9 FF	LDR R255			
0019	85 23	STR R23	Width		
001B	20 51 FF	JSR \$FFF51			
001E	85 2A	LDR R2A	Assembled code buffer		
0020	85 00	STR R00	Reserved for User		
0022	85 20	LDR R20	Assembled code buffer		
0024	85 81	STR R81	Reserved for User		
0026	A5 2C	LDR R2C	Variable type		
0028	85 02	STR R02	Reserved for User		
002B	A5 20	LDR R20	Integer accumulator		
002C	85 03	STR R03	Reserved for User		
002E	A2 00	LDR R00			
0030	A0 09	LDR R09			
0032	A9 01	LDR R01			
0034	20 F1 FF	JSR \$FFF1	OSWORD (Read clock)		

Figure 11: Typical output from \*Trek

## ANNOUNCING ANOTHER GENERATION OF SOFTWARE BARGAINS FROM POTTER PROGRAMS "THE HOTTER PROGRAMS"

### BRIDGEMASTER – Price: £5.95

An entertaining, 100% machine code simulation of bridge, suitable for the beginner and experienced player alike.

A comprehensive bidding system; a competitive playing algorithm; high resolution graphics and player interaction are all major features of this game which can be played in two ways.

1. Demonstration mode – The Electron bids and plays all four hands giving unlimited demonstrations of the bidding and rules of play.

2. Game mode – you bid and play the South hand while the Electron plays the rest. If you or North are in a contract, then you play both hands.

Superb value at only £5.95

### POTTER'S ARCADE 4 PACK – Price: £5.95

Four Arcade type games on 1 tape, which include:

**THE THREE CRYSTALS** – A three part, "3D" Arcade adventure for the serious arcade addict. Features 3 practice modes, pause and sound on/off options.

**YARTSIE** – An exciting computerised dice game for 1-3 players, which combines both chance and skill. Full playing instructions are included.

**FRUITY** – A 4 reel Fruit Machine simulation with everything you would expect from your own personal fruit machine – superb graphics – rapid response – random holds, nudges up or down, shuffle feature. Choice of gambling winnings and a £50 jackpot.

**HUNCHBACH** – Enthralling arcade action as you help Quasimodo rescue Esmeralda. Joystick and sound options.

All four games truly tremendous value at only £5.95

### POTTER'S ADVENTURE 4 PACK – Price: £5.95

Four typically fiendish text adventures on 1 tape which include:

**INNER SPACE** – Following a car crash your consciousness is hovering in the twilight zone between life and death – can you escape back to reality? There are over 100 locations to explore.

**HEXAGRAM OF TRUTANIA VALLEY** – To save your home valley from the evil forces of Tanell, you must find and assemble the legendary hexagram of Trutania – a powerful magic artifact. There are over 200 locations to explore.

**STRANDED ON ILOOFRAZ** – Stranded on the alien planet of Iloofraz, you must find a way back to earth. A challenging adventure with many detailed location descriptions.

**PHILOSOPHER'S STONE** – A quest to find the Philosopher's stone, used by alchemists to turn base metals to gold and it also confers eternal youth. Thrilling adventure action.

All four adventures terrific value at only £5.95

### THE TWIN ORBS OF AALINOR – Price: £3.95

A very difficult and entertaining machine code fantasy adventure with data compression, giving approximately 20,000 characters of text. Features include a split screen display; score and rating system; interactive characters and well over 100 locations with detailed descriptions. Set in the Land of Aalinor, can you harness the power of the Twin Orbs to overcome the evil Gorgoth?

### FLINT STRIKES BACK – Price: £2.95

Once again our hero does battle with the hideous T.E.R.D. organisation. Can you save England from ruin? A real time adventure with over 100 locations and a multi-statement interpreter.

### THE RETURN OF FLINT – Price: £2.95

The sequel to the very popular SUPER AGENT FLINT. As the Super Agent you have successfully docked your captured rocket with the British Space Station, only to find that it has been infiltrated by the dastardly T.E.R.D. organisation. This is where your mission begins.

### SUPER AGENT FLINT – Price: £2.95

The dreaded T.E.R.D. (Terrorist for England's Ruin and Destruction) organisation has moved its ugly head. Only you as Super Agent Flint can capture their interstellar rocket and secret plans. "Quite fast and fun to play... at the price I must recommend it" Electron User.

### GALADRIEL IN DISTRESS – Price: £2.95

The Princess Galadriel has been abducted and an evil spell holds her prisoner. You must seek aid from the Wise Lone Master to release her and save yourself from the wrath of King Theoden.

### THE STAFF OF LAW – Price: £2.95

Can you track down the Staff of Law and master its potent earth power to defeat the Despoiser? "Extremely fiendish... well worth buying" Electron User.

### GROUNDRED – Price: £2.95

A strategic adventure, set in a hostile tropical land. Only a calculating and aggressive mind can do battle with murderous beasts and make ancient magic to escape. Are you up to it?

All adventures with full save game facility for the Electron or BBC B.

**SPECIAL OFFER** on games priced £2.95 each.

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Psychastria	£7.95	£6.50

Games in stock at time of advertising, order early to avoid disappointment. Games returned by 1st Class Mail. Please add 50p Postage and Packing.

**WANTED:** Top quality programs for the Electron/BBC B in machine code or Basic. Send us a copy of your program on cassette for evaluation. Generous royalties paid if accepted. Absolute confidentiality is guaranteed.

Send Cheque or P.O. with your order to:

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THIS short program shows some of the interesting effects that are produced when using GCOL plot options outside the normal range.

The syntax of the command is:

GCOL option,colour

where *colour* is the colour to draw or plot with and *option* specifies the plotting mode.

Plot option 0 means plot the colour straight on to the screen. Options 1 to 3 tell the Electron to OR, AND or EOR the plot colour with the colour of the pixel already on the screen. Option 4 will use the inverse of the plot colour specified.

But what happens if you go outside this range? Well, even Acorn isn't quite sure here since the manual states that "Other values do stripey things...".

This program lets you experiment with GCOL and find out exactly what happens. Some quite unusual patterns and a greater range of colour can be produced with high GCOL plot options.

When the program is run

## By GEORGE SANDERSON

you'll be presented with a menu with three options. The first is for a colour chart and after inputting the GCOL plot option the chart is produced.

The second option is to draw a simple graphics display. Input the GCOL plot option to use. The final option is to end.

That's all there is to it. Enjoy your experimenting!

Press any key  
Or M for Menu



# HAVE FUN

# WITH GCOL

### PROCEDURES

chart  
design  
end

Draws the colour chart.  
Produces the graphic display.  
Draws the final display and ends the program.

```

10 REM GCOL
20 REM By G.R.Sanderson
30 REM (c) Electron User
40 MODE1:VDU 23,1,0;0;0;
0:
50 VDU20,3,25,37,3
60 COLOUR129:CLS
70 VDU20,5,23,35,5
80 COLOUR120:CLS
90 VDU20,7,21,33,7
100 COLOUR130:CLS:COLOUR1
110 PRINTTAB(4,2)" (1) Co
lour chart""TAB(4)" (2) De
sign sample""TAB(4)" (3) T
o end""TAB(4)" Choose a n
umber"
120 A=GET:VDU26:COLOUR120
:CLS
130 IFA=49PROCchart
140 IFA=50PROCdesign
150 IFA=51PROCend ELSE RU
N
160 END
170 DEFPROCchart
180 COLOUR3
190 REPEAT
200 B=0
210 BY=3
220 INPUT""Enter GCOL X,
1 requ.(0 onwards)-->"G:CLS
230 GCOLOR,3
240 FORY=0TO950STEP44
250 MOVE0,Y:DRAW1300,Y
260 NEXT
270 MOVE200,0:DRAW200,950
280 REPEAT
290 FORA=0TO44STEP4
300 GCOLOR,1
310 PLOT77,500,A+B
320 NEXT
330 VDU5
340 MOVE0,A+B-15:GCOLOR,7:
PRINTG
350 B=B+44:G=B+1
360 VDU4
370 UNTILB>900
380 COLOUR1:COLOUR130
390 PRINTTAB(10,1)" Pr
ess any key "
400 PRINTTAB(10,2)" Or
M for Menu "
410 D=GET:COLOUR120:COLOU
R3:CLS
420 UNTILD=77
430 ENDPROC
440 DEFPROCdesign
450 COLOUR3
460 REPEAT
470 INPUT""Start GCOL nu
mber (0 onwards)".C
480 CLS
490 X1=600:Y1=350:X2=0
500 VDU29,630:450:
510 MOVE400,0
520 REPEAT
530 GCOLOR,1
540 FORX=0TO360STEP90
550 MOVE0,0
560 PLOT05,COS(RAD(X))*X1
,SIN(RAD(X))*Y1
570 NEXT
580 X2=X2+1
590 X1=X1-100:Y1=Y1-90:C=
C+1
600 UNTILX2=10
610 COLOUR1:COLOUR130
620 PRINTTAB(10,1)" Pr
ess any key "
630 PRINTTAB(10,2)" Or
M for Menu "
640 D=GET:COLOUR120:COLOU
R3:CLS
650 UNTILD=77
660 ENDPROC
670 DEFPROCend
680 COLOUR130
690 MOVE425,475
700 FORX=0TO360STEP18:MOV
E425,475:GCOLORND(12)+70,1
710 PLOT05,COS(RAD(X))*X*
1.5+425,SIN(RAD(X))*X*1.5+4
75
720 NEXT
730 PRINTTAB(10,14)SPC(9)
740 PRINTTAB(10,15)" GOOD
BYE "
750 PRINTTAB(10,16)SPC(9)
760 VDU23,26370;0;0;0;
770 VDU4:VDU30
780 COLOUR120:COLOUR3
790 ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 53.



# Ravenskull



The Eerie loading Screen



The Elf escapes from a Ravenbee



Close-up of a Crystal Ball



The Adventurer collects a Treasure Chest

## Ravenskull Castle — The Fortress of Doom

Your task is to save the village of Austburg from imminent devastation. You must enter Ravenskull Castle and retrieve the silver crucifix which the evil Baron Strieg has stolen. Only then will Austburg be safe from the Zombies who inhabit the swamp surrounding the medieval castle.

Ravenskull is a massive arcade-adventure featuring smooth 4-way screen scrolling over the 4 levels of play. Each level is 64 times the size of the screen, and there is an initially-bewildering variety of game characters including: acid pools, man-eating plants, time-doors, keys, pick-axes, scythes, spades, bows and arrows, dynamite, bells, food and wine (beware! It may be poisonous or have strange side-effects). There are also several magical scrolls and potions to be found. These may be good or evil; for example the strength scroll gives you the power to push wooden casks, whereas the lightning-strike scroll is fatal if used.

The guardians of the castle, the vicious Ravenbees have to be avoided or, in some cases, destroyed — but there is only one way to kill them; you must discover how as you venture through the dank passages of the castle. Your quest is not an easy one — only with time, experience and a little luck will you unravel all the mysteries within Ravenskull Castle.

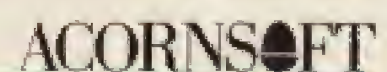
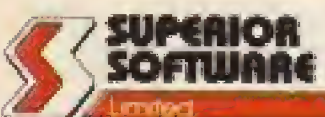
### PRIZE COMPETITION

If you are skilful enough to complete Ravenskull, you can enter our prize competition. The prizes include a £100 first-prize, with Superior Software T-shirts for runners-up.

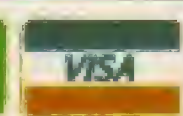
### PRICES

Election cassette.....	£9.95	BBC Micro disc (5 1/4").....	£11.95
BBC Micro cassette.....	£9.95		

Ravenskull is compatible with the BBC B, B+, Master



The screen pictures above show the BBC Micro version of Ravenskull.



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# TOMMY & the TOADSTOOLS

By  
**STUART  
BAIN**

THE evil Wizard Wongo has cast a spell on Cadzow Forest causing all the poisonous toadstools to come to life.

One day when he's out walking in the forest the toadstools start to chase poor Tommy, a little schoolboy.

Now he's lost and needs your help to escape. You must guide Tommy along the platforms and up the ladders back to his house.

There are toadstools to avoid, holes to jump and moving bridges to negotiate, so it's no easy task. To make matters worse there's a time limit.

There is a bonus for completing each screen within the time limit, and there are toffees to collect on the way. Watch out for those deadly toadstools.

The keys are:

Z = left  
X = right  
? = down  
\* = up

Return = jump

*Full listing starts  
on Page 43*

## PROCEDURES

moves	Moves the man.
score	Displays the score.
sweet	Bonus for collecting sweet.
toadstools	Moves the toadstools.
table	Print high scores.
screen	Draws the screen.
house	Draws the house.

## VARIABLES

live%	Lives left.
X%, Y%	Coordinates of man.
score%	Score.
dir%	Direction of bridge.
toad\$	Toadstool characters.
bonus%	Bonus.
man\$()	Tommy.
hi\$()	High scores.
nm\$()	Names.





# YOU can go for gold ...with the **MICRO OLYMPICS**

This is the package that broke all records! More than a game – it's a brilliantly written collection of ELEVEN great track and field events!

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EU02



## Toadstools listing

### From Page 41

```

10 REM * Toadv and the *
20 REM * Toadstools *
30 REM *By Stuart Baine*
40 REM (c) Electron User
50 PROCinit:=FX16
60 ONERROR IFERR<>17MODE
6:VDU10,10,10:REPORT:PRINT"
at line ";ERL:END
70 REPEAT
80 MODE6:PROCTitle
90 MODE5:PROCstart
100 REPEAT:REPEAT
110 PROCmove
120 IF (POINT(XZ+32,YZ-32)
=10RPOINT(XZ+32,YZ-32)=3)AN
DladdZ=FALSE deadZ=TRUE
130 IFdeadZBOTO160
140 PROCtoadstools
150 IF (POINT(XZ+32,YZ-32)
=10RPOINT(XZ+32,YZ-32)=3)AN
DladdZ=FALSE deadZ=TRUE
160 UNTILdeadZORYZ)=991
170 IFdeadZPROCdead ELSEP
ROCnewsheet
180 UNTILliveZ<1
190 PROCgameover
200 MODE6:PROChiscores
210 UNTIL0
220
230 DEFPROCmove
240 IFINKEY-49THEN*FX210,
1
250 IFINKEY-50THEN*FX210,
0
260 IFINKEY-56REPEATUNTIL
INKEY-52
270 bonusZ=bonusZ-10:COLO
UR3:PRINTAB(10,1);STRING$(
4-LENSTR$bonusZ,"0");bonusZ
IFbonusZ=0deadZ=TRUE:ENDPR
OC
280 xZ=XZ:yZ=YZ
290 IFjumpZPROCjump:GOTO3
00
300 HZ=(FNleft-FNright)*6
4
310 IFFNjump ANDNOTladdZS
OUND1,-15,20,1:jumpZ=TRUE:j
umpZ=0:PROCjump:GOTO300
320 IFXZ+HZ>1216ORXZ+HZ<0
HZ=0
330 IFladdZHZ=0
340 XZ=XZ+HZ:IFXZGOTO300
350 IFFNup ANDPOINT(XZ,YZ
-32)=3laddZ=TRUE:YZ=YZ+32
360 IFFNdown ANDPOINT(XZ,
YZ-64)=3laddZ=TRUE:YZ=YZ-32

```

```

370 IFPOINT(XZ+32,YZ-64)=
1ANDladdZladdZ=FALSE:PROCma
n(xZ,yZ):manZ=0:manZ=0:PRO
Cman(XZ,YZ):ENDPROC
380 IFPOINT(XZ,YZ-64)=0AN
DjumpZ=0deadZ=TRUE
390 IFXZ=xZANDYZ=yZENDPRO
C
400 PROCman(xZ,yZ)
410 IFPOINT(XZ+0,YZ)=2PRO
Csweet
420 IFHX=FALSE ANDNOTladd
ZGOTO440
430 manZ=(manZ+1)MOD2:man
Z=0:IFHX<0manZ=2ELSEIFlad
dZmanZ=4
440 PROCman(XZ,YZ)
450 ENDPROC
460
470 DEFPROCjump
480 jumpZ=jumpZ+1:VZ=32
IFjumpZ>2VZ=-32
490 IFXZ+HZ>1216ORXZ+HZ<0
HZ=0
500 XZ=XZ+HZ:YZ=YZ+VZ
510 IFjumpZ>3jumpZ=FALSE
520 ENDPROC
530
540 DEFFNleft
550 IFINKEY-90ORFNjoy=40R
FNjoy=20=TRUE
560 =FALSE
570 DEFFNright
580 IFINKEY-67ORFNjoy=80R
FNjoy=24=TRUE
590 =FALSE
600 DEFFNjump
610 IFINKEY-74ORFNjoy>0=T
RUE
620 =FALSE
630 DEFFNup
640 IFINKEY-73ORFNjoy=1=T
RUE
650 =FALSE
660 DEFFNdown
670 IFINKEY-105ORFNjoy=2=
TRUE
680 =FALSE
690
700 DEFFNjoy=(127-?&FCC0)
+-joyZ
710 DEFPROCman(xZ,yZ)
720 GCOL3,2:MOVExZ,yZ:VDU
5:PRINTman$(manZ+manZ):VDU
4
730 ENDPROC
740 DEFPROCsweet
750 MOVEXZ+64,YZ:GCOL3,3:
VDU5,127,238:SOUND3,-15,200

```

```

,2:scoreZ=scoreZ+50:PROCscor
e
760 ENDPROC
770 DEFPROCscore
780 IFscoreZ>99999scoreZ=
scoreZ-100000
790 VDU4:COLOUR3:PRINTAB
(0,3);"SCORE:";STRING$(5-LE
NSTR$scoreZ,"0");scoreZ
800 ENDPROC
810
820 DEFPROCtoadstools
830 IFscreenZ<>1PROCbridg
e
840 TX=(TX+1)MOD5
850 toadZ=toadZ(TX)
860 IFscreenZ=3ANDTX=2PRO
Ctstools:ENDPROC
870 IFtoadZ=""ENDPROC
880 chrZ=CHR$32:IFRND(5-1
screenZ=1)=1chrZ=CHR$226
890 IFTXMOD2toadZ(TX)=chr
Z+LEFT$(toadZ,17)ELSEtoadZ(
TX)=RIGHT$(toadZ,17)+chrZ
900 rowZ=(32-(TX*5+7))*32
-1
910 GCOL3,3:MOVE64,rowZ:V
DU5:PRINTtoadZ
920 MOVE64,rowZ:PRINTtoad
Z(TX):VDU4
930 ENDPROC
940 DEFPROCtstools
950 tZ=LEFT$(toadZ,5)+RIG
HT$(toadZ,5):chrZ=CHR$32:IF
RND(4)=1chrZ=CHR$226
960 tZ=RIGHT$(tZ,9)+chrZ:
toadZ(2)=LEFT$(tZ,5)+STRING
$(0,"")+RIGHT$(tZ,5)
970 GCOL3,3:MOVE64,479:VD
U5:PRINTtoadZ:MOVE64,479:PR
INTtoadZ(2):VDU4
980 ENDPROC
990 DEFPROCbridge
1000 platZ=platZ+dirZ:IFp
latZ=70RplatZ=1dirZ=-dirZ
1010 VDU17,1,31,platZ-1,10
,32,224,224,32
1020 IFTZ=IFORZ=170130:NEX
T
1030 IFPOINT(XZ,YZ-64)=0AN
DjumpZ=FALSE deadZ=TRUE
1040 ENDPROC
1050 DEFPROCdelay(BZ):TIME
=0:REPEATUNTILTIME>BZ:ENDPR
OC
1060
1070 DEFPROCdead
1080 SOUND1,3,119,45:PROCd
elay(300)

```

```

1090 REPEAT:PROCman(XZ,YZ)
:YZ=YZ-64:PROCman(XZ,YZ):SO
UND0,0,0,0:SOUND1,-15,YZ/0,
-1:UNTILYZ<97
1100 PROCman(XZ,YZ):SOUND0
,0,0,0
1110 liveZ=liveZ-1:IFliveZ
<1ENDPROC
1120 bonusZ=3000:PROCscree
n:ENDPROC
1130
1140 DEFPROCnewsheet
1150 VDU20,4,16,15,14:COLO
UR13:CLS:COLOUR0:PRINT" B
ONUS:";STRING$(4-LENSTR$bon
usZ,"0");bonusZ:VDU26
1160 RESTORE1100:FORIZ=1TO
19:READA:SOUND1,-15,A,2:NEX
T
1170
1180 DATA 4,52,12,60,20,60
,24,72,32,80,40,80,48,96,52
,100,100,100,100
1190 screenZ=screenZ+1:IFs
creenZ>3screenZ=1:liveZ=liv
eZ+1:IFliveZ>9liveZ=9
1200 scoreZ=scoreZ+bonusZ:
bonusZ=3000
1210 PROCscreen:ENDPROC
1220 DEFPROCgameover
1230 PROCdelay(100)
1240 VDU20,4,16,14,14:COLO
UR13:CLS:COLOUR0:PRINT" G
AME OVER":VDU26
1250 RESTORE1270:FORIZ=1TO
14:READA,B:SOUND1,-15,A+40,
B+1,3:SOUND1,0,0,0:NEXT
1260 REM PLAYS GAMEOVER TU
NE
1270 DATA12,4,12,2.5,32,10
,12,4,32,2.5,40,10
1280 DATA12,4,32,2.5,40,5,
12,4,32,2.5,40,5,12,5,32,10
1290 PROCdelay(300):ENDPR
OC
1300
1310 DEFPROChiscores
1320 VDU23,1,0,0,0,0:*FX2
1,0
1330 placeZ=0:REPEAT:place
Z=placeZ+1:UNTILplaceZ=90R$
coreZ>hiZ(placeZ)
1340 IFplaceZ=96GOTO1420
1350 FORIZ=8TOplaceZSTEP-1
:hiZ(IZ)=hiZ(IZ-1):no$(IZ)=
no$(IZ-1):NEXT:hiZ(placeZ)=
scoreZ:no$(placeZ)=":PROCT

```



## From Page 43

able

```

1360 VDU31,0,5:PROCciddle(
"Please enter your name");n
ame$="":YX=2*placeX+5
1370 REPEAT:REPEAT:IX=GET:
UNTILXX>31ANDXX<128ORXX=13
1380 IFIX=127ANDLENname$>0
name$=LEFT$(name$,LEN(name$
)-1)
1390 IFIX>31ANDXX<127ANDLE
Nname$<10name$=name$+CHR$XI
1400 PRINTTAB(25,YX);name$
:" ":UNTILXX=13
1410 na$(placeX)=name$
1420 PROCtable:PRINTTAB(9,
24);"Press SPACE to replay"
:REPEATUNTILINKEY=99:ENDPR
OC
1430 DEFPROCtable
1440 PROCheader
1450 FORIX=1TO8:PRINTTAB(5
,IX*2+5);IX;" ";STRING$(5-
LENSTR$hiX(IX),"0");hiX(IX)
:".....":na$(IX):NEX
T
1460 ENDPROC
1470
1480 DEFPROCinit
1490 VDU23,224,255,24,36,3
6,66,66,129,255
1500 VDU23,225,129,129,129
,129,255,129,129,129
1510 VDU23,226,24,126,255,
255,24,24,24,60
1520 VDU23,237,64,192,56,6
0,60,28,3,2
1530 VDU23,238,0,0,238,130
,234,42,238,0
1540 VDU23,227,28,63,120,1
18,97,34,28,60,23,228,110,1
10,110,110,60,24,24,28,23,2
29,126,126,247,251,60,118,1
10,119
1550 VDU23,230,56,252,30,1
10,134,60,56,60,23,231,110,
118,118,110,60,24,24,56,23,
232,126,126,239,223,60,110,
118,238
1560 VDU23,233,152,100,109
,109,153,255,126,126,23,234
,126,126,126,255,129,129,1,
1
1570 VDU23,235,25,61,109,1
09,153,255,126,126,23,236,1
26,126,126,255,129,129,120,
128

```



```

1580 VDU23,250,1,3,7,15,31
,63,127,255,23,251,140,204,
236,252,252,252,254,255,23,
252,255,132,132,132,252,252
,252,252,23,253,255,33,33,3
3,63,63,63,63
1590 DIMman$(5),toad$(4),h
iX(9),na$(9):FORIX=1TO8:hiX
(IX)=1700-IX*200:na$(IX)="B
AINY SOFT":NEXT
1600 line$=CHR$8+CHR$10
1610 RESTORE1620:FORIX=0TO
5:READA,B:man$(IX)=CHR$A+1i
ne$+CHR$B:NEXT
1620 DATA227,228,227,229,2
30,231,230,232,233,234,235,
236
1630 ENVELOPE3,1,-10,-37,-
89,24,13,46,126,0,0,-126,12
6,126
1640 ENDPROC
1650 DEFPROCstart
1660 liveX=3:scoreX=0:bonu
sX=3000:screenI=1
1670 PROCscreen
1680 ENDPROC
1690 DEFPROCscreen
1700 VDU23,1,0;0;0;0;:COL0

```

```

UR128:CL5
1710 COLOUR1:FORIX=0TO20ST
EP5:PRINTTAB(0,IX):STRING$(
20,CHR$224):;NEXT:PRINTTAB(
17,3):CHR$224:CHR$224:CHR$2
24;
1720 COLOUR2:FORIX=4TO14ST
EP10:VDU31,0,IX,237,31,19,1
X+5,237:NEXT
1730 FORIX=0TO18STEP10:PRO
Cladder(0,IX):NEXT:FORIX=3T
O23STEP10:PROCcladder(19,IX)
:NEXT
1740 PROChouse
1750 GCOL0,1:MOVE600,1000:
DRAW928,1000:DRAW928,944:DR
AW600,944:DRAW600,1000
1760 PROCscore:PRINTTAB(0,
1);"LIVES:";liveXTAB(10,1);
STRING$(4-LENSTR$bonusX,"0"
);bonusXTAB(12,3);"L=0";scr
eenI
1770 PROCsetvar
1780 RESTORE1800:FORIX=1TO
13:READA:SOUND1,-15,A,3:NEX
T:SOUND1,-15,101,7
1790 REM PLAYS START TUNE
1800 DATA101,117,129,117,1

```

```

09,121,137,121,101,117,129,
117,101
1810 PROCdelay(200)
1820 ENDPROC
1830
1840 DEFPROChouse
1850 COLOUR1:VDU31,17,1,25
0,251,0,0,10:COLOUR3:VDU252
,253
1860 ENDPROC
1870
1880 DEFPROCsetvar
1890 XI=0:YI=191:manX=0:ma
nI=0:PROCclean(IX,YI):jumpX=
FALSE:laddX=FALSE:deadX=FAL
SE
1900 TI=0:FORIX=0TO4:toad$(
IX)="" :FORIX=1TO10:chr$=CH
R$32:IFRND(5-(screenI=1))=3
chr$=CHR$226
1910 toad$(IX)=toad$(IX)+c
hr$:NEXT:NEXT
1920 ONscreenI60SUB1940,19
70,2020
1930 ENDPROC
1940 REM *SCREEN 1*
1950 GCOL3,3:VDU5:FORIX=0T
O4:MOVE64,(32-(IX*5+7))*32-
1:PRINTtoad$(IX):NEXT:VDU4
1960 RETURN
1970 REM *SCREEN 2*
1980 toad$(2)="" :60SUB1940
1990 PRINTTAB(6,18):SPC8;
2000 platX=7:dirX=1:COLOUR
1:VDU31,platX,18,224,224
2010 RETURN
2020 REM *SCREEN 3*
2030 60SUB1970:FORIX=1TO10
:chr$=CHR$32:IFRND(4)=3chr$
=CHR$226
2040 toad$(2)=toad$(2)+chr
$:NEIT:toad$(2)=LEFT$(toad$(
2),5)+STRING$(8," ")+RIGHT
$(toad$(2),5)
2050 GCOL3,3:MOVE64,479:VD
U5:PRINTtoad$(2):VDU4
2060 RETURN
2070 DEFPROCcladder(X,Y)
2080 VDU5:GCOL0,3:MOVEX*64
,(32-Y)*32-1:FORI=1TO5:VDU2
25,0,10:NEXT
2090 VDU4:ENDPROC
2100 DEFPROCheader
2110 CLS:VDU23,1,0;0;0;0;
2120 PRINTTAB(7,1):STRING$(
24,"-")TAB(5):CHR$226;" T
OMMY and the TOADSTOOLS ";C
HR$226TAB(7):STRING$(24,"-

```



```

*)
2130 ENDPROC
2140 DEFPROCtitle
2150 *FX21,0
2160 PROCheader:PRINT TAB(
12);"By Stuart Bain"
2170 PRINT TAB(12);"HI-SCO
RE=";STRING$(5-LENSTR$hiX(1
),"0");hiX(1)
2180 PRINT TAB(12,10);"1/2
SOUND OFF/ON";SPC3;"P/R PAU
SE/RESUME"
2190 PRINTTAB(2,12);"2...L
EFT";TAB(29,12);"X...RIGHT"
TAB(15,13);"Ret...JUMP";TAB(
2,14);"F...UP";TAB(29,14);"
7...DOWN"
2200 PRINTTAB(2,16);"A joy
stick maybe use in conjunct
ion";TAB(5,17);"with the FIR
ST BYTE interface"
2210 PRINTTAB(6,20);"PRESS
'1' FOR INSTRUCTIONS";TAB(1
8,22);"OR";TAB(10,24);"PRES
S SPACE TO PLAY";
2220 IX=0;TIME=0;REPEAT:IF
INKEY-30IX=1ELSEIFINKEY-99I
X=2
2230 UNTILIX>0ORTIME>1000
2240 IFFIX=0PROCtable:PRINT
TAB(10,24);"PRESS SPACE TO
PLAY";TIME=0;IX=0;REPEATUN
TILTIME>5000RINKEY-99:IFINX
EY-99IX=2
2250 IFFIX=1PROCinstruction
s:IX=0
2260 IFFIX<260T02160
2270 PROCdelay(100):*FX21,
0
2280 CLS:VDU31,0,12:PROCmi
ddle("JOYSTICKS (Y/N) ?");j
oyX=FALSE:B$=GET$:IFB$="Y";
oyX=TRUE ELSEIFB$<>"N"60T02
280
2290 ENDPROC
2300
2310 DEFPROCinstructions
2320 PROCheader
2330 PRINT":PROCmiddle("T
he Evil Wizard Wongo has ca

```

```

st an evil");PROCmiddle("sp
ell on Cadzow Forest.All th
e Deadly")
2340 PROCmiddle("Poisonous
Toadstools have COME TO LI
FE");PROCmiddle("and are pe
rsuing poor Tommy,");PROCmi
ddle("the little school boy
,")
2350 PROCspace:PROCheader
2360 PRINT":PROCmiddle("Y
ou must guide Tommy along t
he forest");PROCmiddle("pla
tforms and up the ladders t
o his");PROCmiddle("house i
n the corner.You lose a lif
e if")
2370 PROCmiddle("you touch
any toadstools on the way
up");PROCmiddle("or if your
bonus runs out,and you gai
n");PROCmiddle("a life ever
y 3 sheets.")
2380 PROCspace:PROCheader
2390 PRINT":PROCmiddle("A

```

```

bove each ladder is a toffe
e which");PROCmiddle("Tommy
can take for bonus points.
If you");PROCmiddle("clear
a sheet,your bonus time is
added");PROCmiddle("to your
score.")
2400 PRINT":PROCmiddle("W
ATCH OUT FOR THE TOADSTOOLS
IN LEVEL 3")
2410 PROCspace:ENDPROC
2420 DEFPROCspace:PRINTTAB
(7,24);"PRESS SPACE TO CONT
INUE";REPEATUNTILINKEY-99;
ENDPROC
2430 DEFPROCmiddle(B$)
2440 PRINTTAB(20-LEN(B$)/2
);B$
2450 ENDPROC

```

*This listing is included in this month's cassette tape offer. See order form on Page 53.*

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# Micro Messages

## Software for a five-year-old

I HAVE recently bought an Electron for my five-year-old son as a Christmas present and, as I know next to nothing about computers, I am hoping you can help me.

I have bought the October and November 1986 issues of your magazine in the hope that these would help.

What I need is information on software suitable for a five-year-old.

I have sent for the Fun School and Classic Arcade Games tapes, the first because it gave an average age and the second because he can play two of the four games.

The Adventure game you advertise, The Magic Sword, is said to be suitable for small children but at five your reading is limited and I do not know if this is ok.

I hope you can see my problem. I have tried both my local computer stores, but their Electron software is very limited and they were not very helpful in my request for equipment to suit the younger child.

Any ideas you have for literature for myself to help him, or a list of software suitable would be very much appreciated. — M. Purnell, Croesyceiliog, Cwmbran, Gwent

● You'll find a four page pull-out guide to educational software in the September 1985 issue of Electron User. This lists all

the software that was available at the time (there's even more now), describes each product and supplies the address of the company.

Also many of the programs we have published in the past three years can be used by young children. Crocodile Tears in the May 1986 issue is particularly good.

The Magic Sword can be used by young children but they may need a little help from an adult at first. They soon get the hang of it though.

### Easy on the eyes

AFTER inputting about half a long program the other day, my eyes became so crossed following the listing in Electron User that my super lazy streak came to the fore to find an easier way.

I dictated the program on to cassette and played this back, at the same time typing in the program.

Checking for bugs is sim-

pler as well, just play the tape and follow the listing on the screen.

However remember that the speed of dictation is the speed at which you will have to type in the program.

Try it to make life easier and improve accuracy. — Raymond Speare, Stoke Hill, Exeter.

### Constricted crocodile

FOR some time I have enjoyed your listings and played the results with great pleasure but now I have a problem.

Some of the programs I have typed in like Crocodile Tears don't work and give the message "No room at line".

Could it be because I have a Plus 1 connected to my Electron?

I also want to say that your latest program Howzat is a lot of fun and tells me how cricket is to be played, because in Holland nobody really knows. — Patrick van der Pas, Rijswijk.

● The Plus 1 does not affect

the memory available for Basic programs, so this isn't the problem.

Many programs are rather tight on memory and you need to take care when entering listings.

Do not enter any spaces except where absolutely necessary, otherwise you'll run out of memory and the program will stop with an error report.

### Balanced diet for all

I'M INTO my third year of Electron User and what do I think of it so far?

Having dallied on occasions with other computer periodicals I am convinced that Electron User is still the only magazine for Electron owners presenting as it does a nicely balanced diet for all, from beginners to experienced hacks.

The features which, I think, set its high standard are:

● The regular informative articles by R. Waddilove — I suspect this is really a near-intelligent computer which churns out these programs when required.

● The excellent reader-involvement section Micro Messages.

● The clever, artistic illustrations. These are always witty and relevant (don't tell me these are also done by R. Waddilove).

In some instances the illustrations are of a higher standard than the actual games. For example those for A Day At The Races far surpassed the game which I found dull and featureless.

(There is a bit of sour grapes here, of course, as I had offered you a more real-

## Tips for the Plus 3 fraternity

I READ with interest the letter from Mr. Richard Billingham in Micro Messages, December 1986, regarding the addition of a second disc drive to an Electron and Plus 3 setup.

I agree with your reader that the Plus 3 manual is somewhat vague as to such an addition.

I have recently successfully added a further drive to my Plus 3, in my case a 5.25in drive.

I would like to offer some advice gained from my experience to potential second drive purchasers

among your readers.

The Plus 3 will take any size disc drive provided it has its own mains power supply. (I bought Watford Electronic's CS400S).

The ADFS automatically copes with the larger size and storage capacity of a 5.25in drive.

A card edge connecting unit is required (costing under £4), which is clamped on to the cable of the new drive and connects to the edge connector at the rear of the Plus 3's own drive.

It is essential that when you buy your new drive it is

switched internally to drive 1, otherwise it will not work. This can be completed in a few minutes by any reputable dealer.

I hope that this will be of assistance to your readers and help them to avoid some of the pitfalls I encountered.

I have had a second drive now for two months and can thoroughly recommend it. It really takes the ache out of the \*BACKUP and \*DIR-COPY commands.

Many thanks for a fine magazine. — John Thorogood, Bishops Stortford,





## From Page 47

istic and graphic horse race game shortly before your publication).

Collectively my *Electron Users* are a mine of information, advice and ideas. But searching through the mine can be time consuming and chaotic.

I am sure that many subscribers, like myself, refer to their copies constantly for programming and technical information.

Have you considered the publication of an annual index of the year's contents?

— V. J. Horgan, Didcot, Oxon

● We've had suspicions for some time that Roland might be Database's answer to Metal Mickey.

However, the superb artwork you refer to is by a charming young lady called Pam Dunkerley.

Sorry we couldn't publish your horse race game. Two excellent racing programs arrived within days of each other and it was a pity we couldn't use them both. There was nothing to choose between the two so literally a toss of the coin decided which we were going to use.

We like the idea of an index and we'll bear it in mind for the future.

## Alternative language

IN the not too distant future I am considering buying the *Lisp*, *Logo* and *Pascal* rom cartridges, but before I go to any great expense, I should like to know more information regarding their purpose. — B.R. Rushforth, Bradford, West Yorkshire

● These are alternative programming languages to BBC Basic. Some languages are more suited to a particular type of application than others.

We haven't the space to go into any depth here but you'll find a full review of the cassette versions of *Lisp* and *Pascal* in the February and March 1985 issues of *Electron User*.

The rom versions have many more functions and

**WHAT** would you like to see in future issues of *Electron User*?

What tips have you picked up that could help other readers?

Here is your opportunity to share your experiences.

Remember that these are the pages that you

write yourselves. So tear yourself away from your *Electron* keyboard and drop us a line.

The address is:

Micro Messages  
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enable you to write much bigger applications.

We haven't reviewed *Logo*, but Mike Plummer's *Pogo* is a good introduction to the language. This two part series can be found in the December 1986 and January 1987 issues of *Electron User*.

## Morse on the Electron

WITH regard to the letter from Mr. Coggin in the November 1986 *Electron User*, I wish to confirm that the *Centronics* output of the *Plus 1* can indeed be used for the activation of external devices.

I am using these ports for sending and receiving morse code via my amateur-band transceiver.

However, instead of poking the address directly:

```
?%FC71=value
```

I am using the "official" Acorn routine for writing to the port, as this ensures correct operation irrespective of possible different versions of the *Electron* or whether a second processor is present.

In Basic this routine is as follows:

```
AZ=493  
IX=471  
YZ=value  
CALL &FFF4
```

Any masking of the bits can be directly carried out on Y% before the call. The machine code equivalent is:

```
LDA #493  
LDX #471  
LDY #value  
JSR &FFF4
```

As yet I have been unable to read from this port and I suspect that it is configured for write-only by the hardware.

In my case I am using bit 7 of address &FC72 as the input port. The official method of reading is somewhat long-winded in Basic:

```
AZ=492  
IX=472  
YZ=0  
valueX=(USR(&FFF4)AND &FF00  
00)DIV &10000
```

If bit 7 is set a value of 192 is returned on my machine, so:

```
bitX=valueX DIV &BF
```

returns a 1 for bit set, 0 if not set. A direct peek is much simpler if an "unofficial" routine will work on your machine:

```
bitX=(?%FC72 AND &00)DIV &0  
8
```

which returns a 1 for a bit set. The machine code routine is simpler:

```
LDA #492  
LDX #471  
LDY #0  
JSR &FFF4  
STY &70
```

the value of the port is now in &70 from where it can be recovered by a direct peek:

```
valueX=?%70
```

Incidentally, this port requires a negative logic to give the 1s and 0s.

Finally, the so-called slow *Electron* can send and receive morse code much quicker than the average human can! And that's using only Basic programs. — A.E. Ashby, Knott-ingley, West Yorks.

## Adding a database

I BOUGHT my *Electron* in September 1985 and since then I have added a *Plus 1* and *Plus 3* with *View* word processor. I would now like to add a database to my system and am particularly interested in Acornsoft's *Viewstore*.

Can you tell me if this can be obtained on rom cartridge for the *Electron*? I cannot find any reference to this anywhere. — Paul Quinn (age 10), Barrhead, Glasgow

● *Viewstore* is only available for the BBC Micro on rom. We haven't tried it on the *Electron* but one of our readers has reported that it works ok.

You'll need some means of plugging the rom in — for instance a blank cartridge or Rombox. The *Electron*'s keyboard layout is different to the BBC Micro and the new keys to use can be found in *Micro Messages* July 1986.

## Lacking lower case

I AM sure somebody out there can help me! Being completely non-technically minded, I was very proud of myself when shortly after receiving my *Plus 3* I managed to create *IBOOT* files for my discs, the one for *View* consisting of:

```
*WORD  
MODE 3  
PRINTER SR400  
MICROSPACE  
LOAD LETTERHEAD  
*CAT
```

This 'does' nearly everything I need, but to me two things are still lacking, one very important and one less so but desirable.

Try as I might I cannot find how to enter an instruction to put my *Electron* into lower case — and for goodness sake, who wants to write letters all in capitals?

Also I usually enter *Control+S* followed by 04000 (to change the background to blue), to ease the strain on



my poor aged eyes – but how do you do that in a *IBOOT* file? I tried *S 04000* but that didn't work.

So if one of the tame geni among your readers can supply me with the correct sequence of hieroglyphics to pad out my *IBOOT* I should be most grateful. – Mrs. M. Charlton, Kingston Park, Newcastle upon Tyne.

● Insert the following lines just before \*CAT:

```
*FX262,48
*KEY0 1504000
*FX130,0,128
```

The first command switches the Caps lock light off and the other two define a function key to change the background colour to blue.

## Switching characters

EARLY this year we bought an *Electron* with which we are delighted and we have recently added a printer – a Panasonic KP-X1080.

My problem is that I would like to be able to change from English to the German or French character sets while printing a document.

This is not possible with the otherwise excellent Mini Office word processor which we have at present.

Please could you tell me which of the word processing packages currently available for the *Electron*, on cartridge or cassette, will enable me to send control codes directly to the printer.

Regrettably, the *Electron* seems to have disappeared entirely from our local shops and with it any source of information. Three cheers for *Electron User* which more than fills the gap! – Helen Muir, Crewe, Cheshire

● We haven't had any experience of Panasonic printers but if it is Epson compatible you should be able to select a character set by sending the following sequence of codes to the printer: 27,82,n where n is the character set.

To do this you'll need a word processor that allows you to insert printer control codes.

Acornsoft's View and

Slogger's Starword both enable you to this. However, you'll need a printer driver generator to go with them.

Slogger can supply a suitable program for Starword and you'll find a View driver in the August 1986 issue of *Electron User*. Alternatively, you can use Acornsoft's View Printer Driver Generator for the BBC Micro – we haven't tried it ourselves but many of our readers have reported that it works ok.

## Random reflections

I HAVE now had my *Electron* for quite a while, and until recently I was convinced that the random number generator fed out an unpredictable sequence of numbers.

However this seems not to be the case. Immediately after turning on your *Electron*, type in and run this small program:

```
10 CLS
20 FOR i=1 TO 10
30 PRINT(RND(100))
40 NEXT
```

Your *Electron* will generate the numbers 19, 29, 27, 90, 79, 55, 9, 98, 29. There may be a slight variation if you have a Plus 1 or Plus 3 fitted.

If you turn off your *Electron* and repeat the operation the same sequence of numbers will appear. Not exactly unpredictable, is it?

More importantly, this means that every time a program is run which uses random numbers to control events, it will be possible to

predict those events.

Snap Dragon in the July 1986 issue written by Keith Owens and myself, will illustrate what I mean.

Turn off your *Electron*, then turn it on and load and run Snap Dragon (assuming that you already have it saved).

If a Plus 1 and Plus 3 are fitted the first cards printed will be as follows: Queen of Diamonds, Jack of Hearts, Ace of Diamonds, Ace of Diamonds and so on.

Every time Snap Dragon is loaded immediately after your *Electron* is turned on, these cards will be repeated.

The cards may vary slightly if you do not have a Plus 1 and Plus 3 fitted.

Before buying my *Electron* I used to own a Texas computer which contained within it's Basic language the command RANDOMIZE.

This reseeded the random number generator so that it produced an unpredictable sequence of numbers every time it was used.

Is there a similar command available on the *Electron*? If there is, I have never seen any reference to it.

My own solution to this problem is as follows: For any program relying on the random number generator add the following line:

```
CLS:INPUT TAB(2,16)"Input a
number between 1 and 100:"
numX:FOR iX=1 TO numX:A=RND:
NEXT
```

Just insert it into an appropriate place near the start of your programs and, provided you input a different value into num% each time you switch on, your *Electron* will become almost unpredictable.

In Snap Dragon it should be inserted at line 55, and should be preceded by the condition IF Z%=0... This will ensure that the routine will only be called once, when the *Electron* is first switched on.

Because Snap Dragon runs in Mode 1 there is not a great deal of memory to spare, so just by adding this extra line you may get the dreaded 'No room' error message.

If so, don't worry, just delete the lines holding the instructions, 1960 to 1990. You probably know them by now anyway. You will now have all the memory you need.

I hope this tip proves useful to your readers. Many thanks for a great magazine. – Philip Ord, Egremont, Wallasey, Merseyside.

● When the *Electron* powers up it seeds the random number generator with the same value each time – it's written into the Basic rom.

The random numbers generated are in fact not random but follow a very complex sequence based on this seed. If the seed is the same each time it follows that the sequence will be the same also.

A quick and simple method of seeding the generator is with:

```
R%=RND(-TIME)
```

A suitable place to insert this would be just after the instructions.

The time taken to read these will always be slightly different so the random number generator will be seeded with a different number each time.

## Epson dump

HAVE you ever published a screen dump for an Epson, or Epson compatible printer? If any readers know of one, I would be most grateful for any information. – Simon Barker, Cowes, Isle of Wight

● We have published several screen dumps – the most recent were in the June 1986 issue of *Electron User* where you'll find dumps for both Shinwa and Epson printers.

ALL programs printed in this issue are exact reproduction of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program

they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.



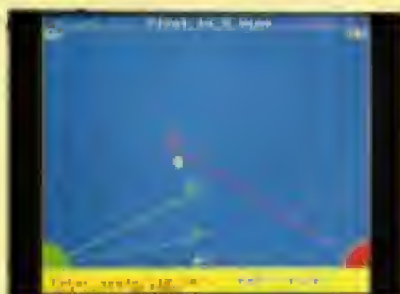
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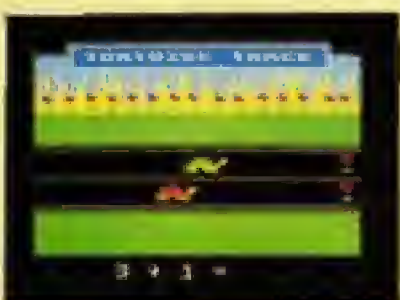
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and colour recognition



**Angler:** Fun with angle  
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**Spelldroid:** Learn to spell  
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**Tortal:** Teach and test  
the rules of single addition

## Educational Computing on the Electron

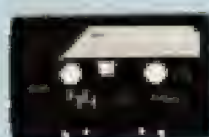
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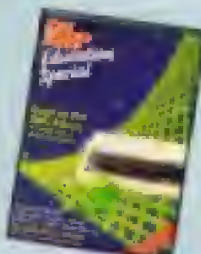


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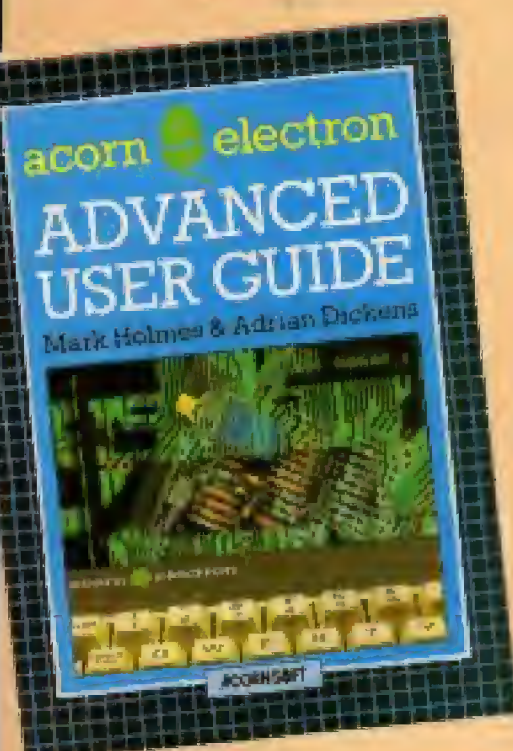
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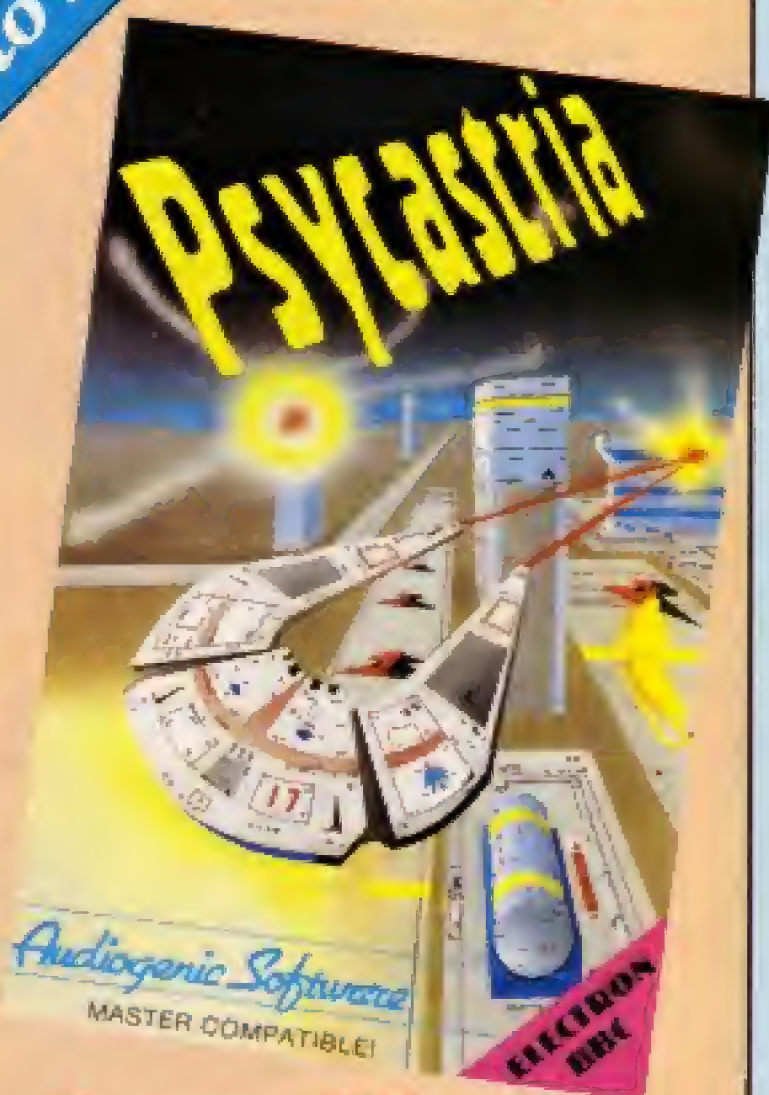
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```

1 BX=0:BY=0:BX=1:MODE4:
VDU23,225,24,60,126,219,126
,36,66,129,23,226,16,64,2,3
2,149,81,58,124,23,224,0,0,
0,73,93,62,127,127,23,227,0
,60,40,60,123,152,20,0,19,1
,RND(7);0;23,1,0;0;0;0:ENVE
LOPE1,1,-15,-0,-3,10,10,10,
0,0,0,0,0:CLS:XX=19:YY=27
2 FORI=10TO1279STEP10:M
OVE1,110:MOVE1-10,110:PLOT0
5,1-RND(10),RND(15)+110:NEX
T:S=0:A=120:REPEAT:PRINTTAB
(2,30)"SCORE=";S;TAB(22,30)
"AMMO=";A;" ";TAB(XX,YY)" "
1:XX=XX+INKEY(-98)-INKEY(-6
7):IFXX<1XX=1ELSEIFXX>30XX=
30 ELSEIFINKEY(-74)PROCfire
3 PRINTTAB(XX,YY)CHR$(2
24);:IFBX=1 AND RND(30)=1 B
X=RND(30):BY=1:PROCbomb EL
SIFBX=0 PROCbomb
4 UNTILFALSE
5 DEFPROCbomb:PRINTTAB(
BX,BY)" ";IFXX>BX BX=BX+1
ELSEIFXX<BX BX=BX-1
6 RF=RND(31)-2:BX=BX+RF:
BY=BY+1:IFBX=XX AND BY=YY S
OUND0,-15,6,10:PRINTTAB(7,2
3)"DEAD!"..."PRESS P TO PLA
Y AGAIN":REPEAT:K#=GET$:UNT
ILK#="P":RUN
7 PRINTTAB(BX,BY) CHR$2
25:BX=0:IF BY=27 BX=1:PRINT
TAB(BX,BY)CHR$226;:SOUND0,-
15,4,5:S=S+5
8 ENDPROC
9 DEFPROCfire:IFA=060TO
10ELSEA=A-1:SOUND011,1,255,
5:SCOL0,1:MOVE(XX+32)+16,14
0:DRAW(XX+32)+16,1000:SCOL0
,0:DRAW(XX+32)+16,140:IFXX=
BX SOUND0,-15,5,0:PRINTTAB(
BX,BY)CHR$227;:BX=1:FORW=1T
O150:NEXT:PRINTTAB(BX,BY)"
";:BX=1:BX=0:BY=0:S=S+50
10 ENDPROC

```

SCORE=5

AMMO=117

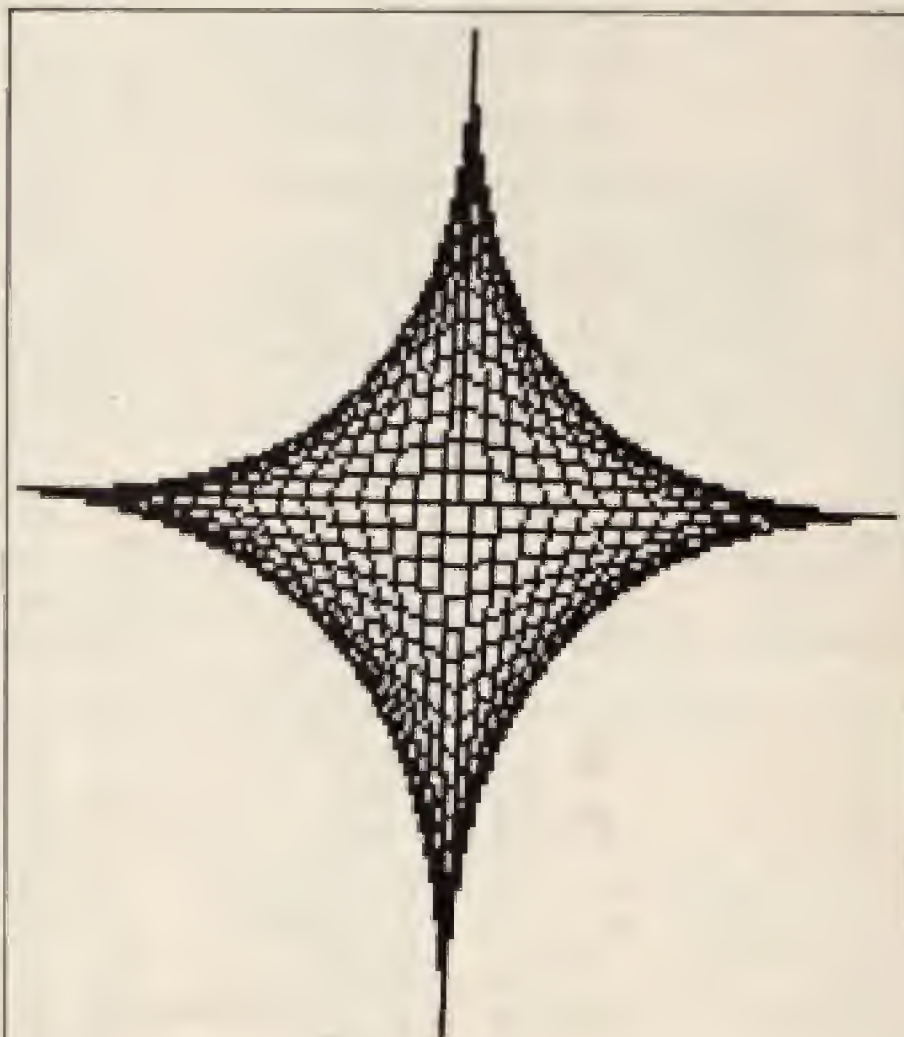
# Mandala

HERE'S a short listing by S. Collins to produce an interesting mandala pattern.

```

1 MODE1:FLAG=0:L=1
2 SCOL0,L:A=800:B=600
3 FORF=0 TO 15:MOVE 600
,A:DRAWB,500:A=A-20:B=B+20:
NEXT
4 FORF=0 TO 15:MOVE600,
A:DRAWB-10,500:A=A-20:B=B-2
0:NEXT
5 FORF=0 TO 15:MOVE600,
A:DRAWB-10,500:A=A+20:B=B-2
0:NEXT
6 FORF=0TO15:MOVE600,A:
DRAWB+10,500:A=A+20:B=B+20:
NEXT
7 IF FLAG=0 FLAG=1 ELSE
FLAG=0
8 IF FLAG=1 SCOL0,7:GOT
O3
9 IFL=0 OR L=1 L=L+1 EL
SE L=0
10 GOTO2

```







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## First program

TRY typing the following into your Electron, remembering to press the Return key at the end of every line:

```
10 first=100
20 second=200
30 sum=first+second
40 PRINT sum
```

As you'll know by now this is a program. Not that it does much. It just sits in the micro's memory waiting.

Clear the screen with CLS and you'll see whatever you've typed in disappear from the display.

But while you may not now be able to remember what you've typed in, the Electron does. Or at least it remembers the lines that began with numbers.

You can prove this by telling the micro to list them out with LIST, when the program will duly appear.

The trouble is it's still not doing anything. And it's no surprise. The reason it's not doing anything is that you've not told it to do anything!

The Electron is a typical Jobsworth. You know the type - they'll do what they're told to do but do nothing on their own initiative as "It's more than my job's worth".

So get the computer to run the program by using the aptly named command RUN. And unless you've made a typing error, the answer 300 will appear on the screen.

There should be no mystery as to why this has happened. The first two lines of the program assign values to the numeric variables *first* and *second* while the third line adds the two values and stores the result in another numeric, *sum*. The next line uses PRINT to display this. And that sums up the first program.

## Concatenation

Flushed with success from the last program, let's move on to:

```
10 moggys="cats"
20 mutts="dogs"
30 spaces=" "
40 fullstop="."
50 weather=moggys+spaces+"and"+spaces+
  utts
60 PRINT "It's raining" weather$ fullsto
  p$
```

From the dollar sign (\$) at the end of the variable names, you should see that the first four lines are just concerned with assigning strings to string variables.

While lines 30 and 40 aren't really necessary I've put them in as listing is easier to follow if you type in the names rather than a space or a full stop when lines get complicated. Line 50 could be:

```
50 weather=moggys+" "+and+" " +utts
```

but those spaces are asking for trouble. As the program carries on weather\$ is created by concatenation and line 60 prints out the message. Can you see why:

```
60 PRINT "It's raining" spaces+weather$
  fullstop$
```

produces the same output as the previous line 60?

# BACK TO BASICS

## Sixth part of TREVOR ROBERTS' down-to-earth series

### Old and New

By now you should have grasped how CLS clears the screen but leaves the program in memory intact. Sometimes you'll want to get rid of a program completely.

The way to do this is to use the command NEW. Try it and see. Any program in memory disappears. You can't LIST it and you certainly can't RUN it.

NEW is a very powerful command, to be used with care. Happily if you do use it by mistake and you haven't typed in any other program lines, you can recall the program with OLD. Try it and see.

### Order, order

Although they're very different the previous two programs do have a lot in common.

For a start they sit in memory not doing anything until they're RUN. And they can be listed out with LIST. But there's more than that.

Have you noticed anything about the RUN command? All it does is tell the Electron to run the program but it doesn't tell it where to start.

The Electron figures this out for itself by looking at the line numbers (the numbers found at the beginning of the program lines) and picking the lowest it can find.

It performs this line (in both the above programs it was line 10) and then looks for another. Again it picks the lowest number it can find that hasn't been performed. In this case it's 20. Once that's done, it goes on to the next line and so on.

Now this might seem fairly obvious but it's quite important to grasp that the Electron runs its programs one line at a time, one after the other in a fixed sequence. And this sequence depends on the line numbers.

Having said that, how does the Electron know when to stop? The answer is that the program stops when the Electron can't find any more lines left to run.

In the first program this is after it has processed line 40; in the second after it has dealt with line 60. There are no more lines left so the program halts.



## More orders

Try typing in the following program exactly as it stands:

```
20 PRINT "of entry"  
40 PRINT "matter"  
10 PRINT "The order"  
30 PRINT "doesn't"
```

As you can see, the line numbers don't follow any specific order. First there's line 20, then line 40, next line 10 and finally line 30. It's a right jumble.

So what's going to happen when we RUN the program? Will the screen show:

```
of entry  
matter  
The order  
doesn't
```

or:

```
The order  
of entry  
doesn't  
matter
```

Again, try it and see. And if you've understood what you've read about the Electron always looking for the lowest line number and starting from there, you should have no difficulty in seeing why it's the second lot of output that appears.

Just to confirm it, do a quick LIST which will show:

```
10 PRINT "The order"  
20 PRINT "of entry"  
30 PRINT "doesn't"  
40 PRINT "matter"
```

proving that even though you entered the lines in the wrong order, the Electron can still sort them out.

## The intentions of numbering in tens

Still on the subject of line numbers have a look the next program:

```
23 PRINT "Look at"  
67 PRINT "these"  
103 PRINT "line numbers"
```

and see if you can spot what's different.

The answer is, of course, that the line numbers look wrong. Up to now all our programs have had the lines numbered 10, 20, 30 and so on.

In other words they've started at 10 and gone up in 10s. With this program it's very different. The question is, will it still work when you enter RUN?

The answer is yes. The program doesn't have to start at line 10, it can start at almost any number. And successive lines don't have to go up in 10s.

The Electron just picks the lowest numbered line and does it, then looks for the next lowest, does that and so on.

From this you'll see that it's perfectly possible to have a program:

```
1 PRINT "Programming"  
2 PRINT "is"  
3 PRINT "easy"
```

where the line numbers start at 1 and go up in 1s. However, while the Electron will accept it and the program will work, it's not very flexible.

Suppose you wanted to add another line between lines 2 and 3. What line number would you use for it? 2.5?

Try it and see. You'll find that Basic only allows whole numbers at the beginning of lines.

This is why it's normal to number the lines as we have done, starting at 10 and going up in 10s. To see it, modify the program so 1, 2 and 3 are replaced by 10, 20 and 30.

However, don't bother using NEW to get rid of the 1, 2, 3 program, the Electron will rejig the line numbers into the usual pattern for you. All it needs is the command RENUMBER (not forgetting to press Return).

The result is that the program becomes:

```
10 PRINT "Programming"  
20 PRINT "is"  
30 PRINT "easy"
```

as you'll see if you LIST it.

Now if we want to slip in another line, it's easy. Just pick a line number that comes in between the numbers of the lines that will be on either side of the new line. So if we add:

```
25 PRINT "not"
```

a LIST will show the program as:

```
10 PRINT "Programming"  
20 PRINT "is"  
25 PRINT "not"  
30 PRINT "easy"
```

Try doing that when the line numbers are 1, 2 and 3! Notice that I picked 25 when I could have used 22 or 27 or any number between 21 and 29. Can you think why?

And, to keep the line numbering to our standard, do a quick RENUMBER which rennumbers the program as:

```
10 PRINT "Programming"  
20 PRINT "is"  
30 PRINT "not"  
40 PRINT "easy"
```

Finally, since the program doesn't tell the truth, get rid of line 30 by typing in 30 and pressing Return. The result is:

```
10 PRINT "Programming"  
20 PRINT "is"  
40 PRINT "easy"
```

You'll see from this that just typing in a line number by itself and pressing Return deletes that line from the program.

And unlike after NEW, you can't use OLD to fetch it back. It's gone for ever.

For practice, play around with line numbers – and see if you can answer these questions:

Can you use 0 as a line number?

What's the highest line number you can have?

● And that is where we part company for this month. Next time we'll be looking at more programs.



# Cartridge survey

**ROLAND WADDILOVE evaluates eight of the market leaders**

ONE of the most useful features of the BBC Micro is its ability to access software on rom. Five sockets are provided on the main circuit board, two are taken up by the operating system and Basic which leaves three empty.

These sockets are commonly filled with a DFS, word processor, toolkit or whatever.

Although the Electron has the software within its operating system to enable it to access sideways roms, unfortunately it hasn't got the hardware to enable them to be plugged in.

However, adding a Plus 1 provides you with two multi-purpose sockets (among other things), which can be

put to a variety of uses.

Perhaps the most common use is for cartridges containing software on rom, and probably the most well known of these is Acornsoft's View.

These cartridges contain an ordinary rom soldered on to a small PCB, and unless you're pretty adept with a soldering iron they can't be used for any other rom software.

Fortunately many third party hardware suppliers can provide blank cartridges. These contain an empty rom socket mounted on a small PCB.

The advantage of a blank cartridge is that it can be used for any rom software – simply plug the rom in the socket and plug the cartridge in the Plus 1.

The cartridge is re-useable so you can unplug it at any time, open it up and replace the rom with another.

There are many cartridges to choose from – take a look at the photograph accom-

panying this article. So what are the advantages and disadvantages of each and which is the best?

There are no simple answers here because it all depends on what you require from your cartridge, and my needs are probably different from yours.

Ask yourself how many roms you are likely to buy before deciding on any particular one. Do you need one socket, two or more? Are you going to be swapping roms frequently?

If you are likely to be buying several roms, obviously you'll need several sockets and the Expander Systems board is probably best in these circumstances.

This will take up to four roms and a bank of four switches enables you to select any rom, though you can only use one at a time.

Are you going to be inserting and removing roms regularly? If so, a cartridge with ZIF sockets would be an advantage. A ZIF socket – Zero Insertion Force –

means that it requires little effort to insert the rom.

The pins on a rom are quite easy to bend when pushing it into a socket and it's quite easy to ruin a perfectly good unit. A ZIF is designed to prevent this from happening.

Care Electronics cartridges can be supplied with either one ZIF and one ordinary socket or two ZIF sockets.

If you simply want to use one particular rom, ACP's Advanced Rom Adaptor 1 is well worth considering. It contains a single socket and is also quite cheap.

However, for a couple of pounds more Slogger's cartridge enables you to plug in two roms and the sockets are slightly better as well.

To sum up, each cartridge has its advantages – it all depends on what you require. My advice is to first decide how many and which roms you intend to buy, then choose the cartridge which enables you to use them best. ■

**Products:** Advanced Rom Adaptor 1 (£10.35)

Advanced Rom Adaptor 2 (£14.95)

**Supplier:** Advanced Computer Products, 6 Ava House, High Street, Chobham, Surrey GU24 8LZ.  
Tel: 0276 76545

**Product:** Peartree Master Cartridge

**Price:** £9.14

**Supplier:** Peartree Computers, St George's House, 14 George Street, Huntingdon, Cambs PE18 6BD.  
Tel: 0480 50595

**Product:** Slogger Twin Rom Cartridge

**Price:** £12.95

**Supplier:** Slogger, 107 Richmond Road, Gillingham, Kent ME7 1LX.  
Tel: 0634 52303

**Product:** Standard cartridge with two IC sockets (£7.95). Cartridge with one ZIF and one IC socket (£13.57). Cartridge with two ZIF sockets (£18.63).

**Supplier:** Care Electronics, 800 St Albans Road, Garston, Watford, Herts WD2 6NL.  
Tel: 0923 672102

**Product:** Epron Plus

**Price:** £15.95

**Supplier:** Expander Systems, 99 Staley Hall Road, Staleybridge, Cheshire SK15 3DP.  
Tel: 061-303 7846

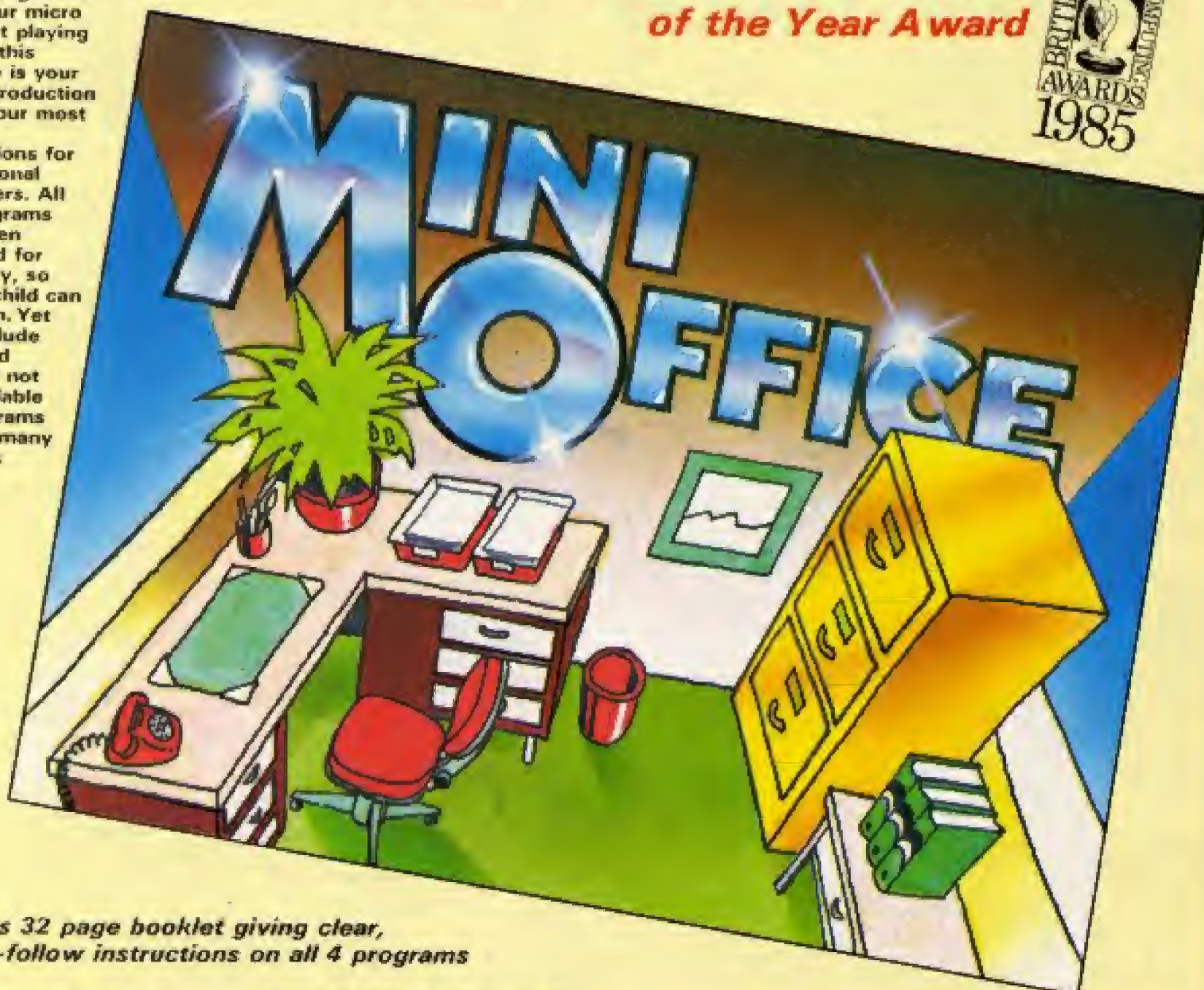
Top row (left to right):  
Advanced Rom Adaptor 1,  
Peartree Master cartridge,  
Slogger Twin Rom cartridge,  
Advanced Rom Adaptor 2.  
Middle row: the Care range.  
Bottom row: Epron Plus





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**Spreadsheet:** Enables you to use your micro for home accounts or pocket money records. It creates a display of numbers in rows and columns. Continuous updating is possible, and a changed figure can be instantly reflected throughout the rest of the spreadsheet. Your results can be saved, to be used for future updates, or can be fed into its associated program.

**Graphics:** Part of the spreadsheet section, it lets you draw bar charts, pie charts and histograms to give a graphic presentation of your statistics. Helps to give life and colour to the duller figures!

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